Vol. 1084 Number 4

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

November 24, 1987

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OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

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Electrical (4,709,119)	1971
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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $6.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987 and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

International PCT fees were changed due to differences in the exchange rate and International PCT Chapter II fees effective July 1, 1987 were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

The national fees effective July 1, 1987 for entering the U.S. Patent and Trademark Office as a designated or elected Office as announced in the *Official Gazette* at 1079 O.G. 32, on June 16, 1987 are included for convenience of applicants.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	520.00
—Corresponding prior U.S. national application filed:	350.00
—Supplemental search fee, per additional invention	140.00
European Patent Office as Searching Authority	1180.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority	370.00
—Additional examination fee, per additional invention	125.00
—Searching Authority not the USPTO	570.00
—Additional examination fee, per additional invention	190.00
International fees	
Basic fee:	485.00
Basic Supplemental fee (for each page over 30):	10.00
Designation fee for the first 10 national or regional offices:	120.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	150.00
Supplement to the handling fee	150.00

U.S. National Stage fees

	Small Entity	Non-Small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA	170.00	340.00
USPTO was neither ISA nor IPEA	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4)	25.00	50.00
—For each independent claim in excess of 3	17.00	34.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	26.00	26.00

June 2, 1987.

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on November 20, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,483,019 through 4,484,358
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e)

and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED SEPTEMBER 6, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,402,093	06/374,829	9/6/83
4,402,098	06/306,308	9/6/83
4,402,101	06/291,043	9/6/83
4,402,105	06/293,679	9/6/83
4,402,113	06/335,738	9/6/83
4,402,121	06/300,891	9/6/83
4,402,123	06/301,990	9/6/93
4,402,124	06/342,187	9/6/83
4,402,132	06/250,434	9/6/83
4,402,135	06/250,830	9/6/83
4,402,144	06/296,464	9/6/83
4,402,152	06/224,092	9/6/83
4,402,153	06/251,730	9/6/83
4,402,154	06/241,562	9/6/83
4,402,157	06/278,208	9/6/83
4,402,175	06/241,605	9/6/83
4,402,177	06/331,203	9/6/83
4,402,190	06/377,022	9/6/83
4,402,194	06/333,614	9/6/83
4,402,196	06/365,925	9/6/83
4,402,202	06/279,335	9/6/83
4,402,205	06/322,260	9/6/83
4,402,210	06/303,198	9/6/83
4,402,214	06/252,484	9/6/83
4,402,215	06/301,254	9/6/83
4,402,220	06/221,303	9/6/83
4,402,223	06/290,830	9/6/83
4,402,239	06/243,653	9/6/83
4,402,247	06/303,245	9/6/83
4,402,248	06/302,859	9/6/83
4,402,249	06/278,383	9/6/83
4,402,251	06/303,664	9/6/83
4,402,259	06/294,650	9/6/83
4,402,263	06/318,098	9/6/83
4,402,265	06/250,884	9/6/83
4,402,269	06/278,026	9/6/83
4,402,270	06/314,760	9/6/83
4,402,271	06/243,429	9/6/83
4,402,272	06/261,501	9/6/83
4,402,276	06/264,740	9/6/83
4,402,278	06/343,106	9/6/83
4,402,282	06/288,490	9/6/83
4,402,287	06/349,299	9/6/83
4,402,288	06/223,676	9/6/83
4,402,292	06/240,639	9/6/83
4,402,293	06/240,690	9/6/83
4,402,296	06/260,252	9/6/83
4,402,298	06/309,587	9/6/83
4,402,320	06/361,639	9/6/83
4,402,324	06/278,514	9/6/83
4,402,328	06/258,322	9/6/83
4,402,345	06/343,120	9/6/83
4,402,351	06/225,449	9/6/83
4,402,355	06/301,295	9/6/83
4,402,358	06/434,674	9/6/83
4,402,363	06/326,465	9/6/83
4,402,372	06/303,891	9/6/83
4,402,378	06/223,230	9/6/83
4,402,383	06/298,400	9/6/83
4,402,385	06/267,689	9/6/83
4,402,401	06/314,751	9/6/83
4,402,404	06/383,563	9/6/83
4,402,406	06/321,464	9/6/83
4,402,407	06/217,176	9/6/83
4,402,411	06/287,216	9/6/83
4,402,428	06/244,822	9/6/83
4,402,437	06/216,987	9/6/83
4,402,439	06/333,720	9/6/83
4,402,441	06/223,810	9/6/83
4,402,442	06/308,178	9/6/83
4,402,463	06/294,623	9/6/83
4,402,464	06/257,516	9/6/83
4,402,471	06/290,156	9/6/83
4,402,474	06/303,383	9/6/83
4,402,487	06/261,056	9/6/83
4,402,489	06/229,544	9/6/83
4,402,491	06/402,375	9/6/83
4,402,497	06/308,846	9/6/83
4,402,500	06/227,792	9/6/83
4,402,501	06/307,075	9/6/83
4,402,503	06/257,889	9/6/83
4,402,504	06/265,184	9/6/83
4,402,505	06/290,216	9/6/83
4,402,508	06/327,917	9/6/83
4,402,509	06/361,877	9/6/83
4,402,513	06/373,352	9/6/83
4,402,516	06/454,937	9/6/83

Patent Number	Serial Number	Issue Date
4,402,535	06/244,775	9/6/83
4,402,536	06/219,914	9/6/83
4,402,538	06/312,204	9/6/83
4,402,551	06/276,609	9/6/83
4,402,552	06/268,592	9/6/83
4,402,560	06/282,778	9/6/83
4,402,576	06/281,906	9/6/83
4,402,579	06/288,217	9/6/83
4,402,582	06/343,598	9/6/83
4,402,594	06/360,871	9/6/83
4,402,624	06/248,243	9/6/83
4,402,628	06/245,990	9/6/83
4,402,642	06/224,463	9/6/83
4,402,644	06/419,557	9/6/83
4,402,649	06/288,048	9/6/83
4,402,664	06/260,823	9/6/83
4,402,670	06/295,378	9/6/83
4,402,676	06/262,268	9/6/83
4,402,681	06/300,936	9/6/83
4,402,683	06/335,243	9/6/83
4,402,686	06/281,679	9/6/83
4,402,687	06/364,874	9/6/83
4,402,691	06/286,474	9/6/83
4,402,693	06/376,798	9/6/83
4,402,699	06/258,523	9/6/83
4,402,710	06/372,421	9/6/83
4,402,711	06/372,422	9/6/83
4,402,715	06/333,649	9/6/83
4,402,727	06/377,879	9/6/83
4,402,728	06/372,515	9/6/83
4,402,730	06/225,046	9/6/83
4,402,731	06/340,949	9/6/83
4,402,732	06/341,038	9/6/83
4,402,738	06/352,194	9/6/83
4,402,741	06/359,766	9/6/83
4,402,745	06/257,912	9/6/83
4,402,756	06/308,808	9/6/83
4,402,775	06/391,268	9/6/83
4,402,778	06/290,357	9/6/83
4,402,784	06/241,334	9/6/83
4,402,813	06/402,390	9/6/83
4,402,816	06/302,012	9/6/83
4,402,817	06/320,552	9/6/83
4,402,851	06/338,067	9/6/83
4,402,853	06/365,248	9/6/83
4,402,854	06/424,624	9/6/83
4,402,868	06/315,128	9/6/83
4,402,873	06/421,807	9/6/83
4,402,876	06/324,209	9/6/83
4,402,886	06/431,442	9/6/83
4,402,904	06/217,713	9/6/83
4,402,908	06/392,420	9/6/83
4,402,919	06/245,386	9/6/83
4,402,945	06/261,243	9/6/83
4,402,947	06/308,725	9/6/83
4,402,948	06/227,764	9/6/83
4,402,954	06/321,842	9/6/83
4,402,965	06/405,438	9/6/83
4,402,967	06/256,623	9/6/83
4,402,968	06/268,304	9/6/83
4,402,985	06/396,249	9/6/83
4,403,009	06/444,409	9/6/83
4,403,011	06/328,886	9/6/83
4,403,023	06/309,068	9/6/83
4,403,052	06/412,473	9/6/83
4,403,071	06/355,037	9/6/83
4,403,072	06/300,619	9/6/83
4,403,099	06/352,830	9/6/83
4,403,113	06/324,604	9/6/83
4,403,132	06/284,874	9/6/83
4,403,137	06/325,341	9/6/83
4,403,153	06/364,265	9/6/83
4,403,154	06/331,734	9/6/83
4,403,156	06/251,803	9/6/83
4,403,159	06/297,788	9/6/83
4,403,163	06/294,150	9/6/83
4,403,167	06/224,644	9/6/83
4,403,175	06/265,364	9/6/83
4,403,209	06/217,190	9/6/83
4,403,214	06/309,591	9/6/83
4,403,218	06/294,263	9/6/83
4,403,222	06/237,003	9/6/83
4,403,230	06/356,325	9/6/83
4,403,246	06/321,327	9/6/83
4,403,260	06/234,440	9/6/83
4,403,270	06/254,194	9/6/83
4,403,275	06/244,275	9/6/83
4,403,278	06/324,642	9/6/83
4,403,311	06/244,715	9/6/83
4,403,332	06/224,392	9/6/83
4,403,333	06/296,972	9/6/83
4,403,337	06/321,522	9/6/83
4,403,346	06/320,437	9/6/83

Notification of Acceptance of Delayed Payment of Maintenance Fee (35 U.S.C. 41(c); 37 CFR 1.378)

The patent listed below is considered as not having expired but is subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,395,995	06/284,527	8/02/83	7/17/81	10/27/87

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,331,739, Re. S.N. 106,442, Filed Oct. 9, 1987, Cl. 428/544, AMORPHOUS METALLIC STRIPS, Mandayam C. Narasimhan, Owner of Record: *Allied Corp., Morris Township, N.J.,* Attorney or Agent: Ernest D. Buff, et al., Ex. Gp.: 154

4,417,591, Re. S.N. 101,668, Filed Sept. 28, 1987, Cl. 128/731, APPARATUS AND METHOD FOR TOPOGRAPHIC DISPLAY OF MULTICHANNEL EEG. DATA, Norman D. Culver, Owner of Record: *Braintech, Inc., Spotswood, N.J.,* Attorney or Agent: David E. Brook, et al., Ex. Gp.: 335

4,498,060, Re. S.N. 101,660, Filed Sept. 28, 1987, Cl. 340/728, APPARATUS AND METHOD FOR TOPOGRAPHIC DISPLAY OF MULTICHANNEL DATA, Norman D. Culver, Owner of Record:

Braintech, Inc., Spotswood, N.J., Attorney or Agent: David E. Brook, et al., Ex. Gp.: 264

4,545,329, Re. S.N. 105,620, Filed Oct. 8, 1987, Cl. 122/17, WATER HEATER, Charles L. Adams, Owner of Record: *PVI Industries, Inc., Fort Worth, Tex.*, Attorney or Agent: Perry J. Saidman, et al., Ex. Gp.: 344

4,546,244, Re. S.N. 105,770, Filed Oct. 6, 1987, Cl. 250/211J, NONLINEAR AND BISTABLE OPTICAL DEVICE, David A. B. Miller, Owner of Record: *Bell Telephone Laboratories, Inc., Murray Hill, N.J.*, Attorney or Agent: John P. McDonnell, et al., Ex. Gp.: 255

4,548,375, Re. S.N. 102,400, Filed Sept. 29, 1987, Cl. 248/205.2, HOLDER FOR ALL ITEMS AND THE LIKE, Ernest Moss, Owner of Record: *Inventor,* Attorney or Agent: Edwin D. Schindler, Ex. Gp.: 355

4,548,455, Re. S.N. 105,153, Filed Oct. 6, 1987, Cl. 439/152, CONNECTOR WITH LOCK MECHANISM, Tadayoshi Ezure, Owner of Record: *Hosiden Electronics, Co., Osaka, Japan,* Attorney or Agent: Elliott I. Pollock, et al., Ex. Gp.: 322

4,555,893, Re. S.N. 105,137, Filed Sept. 28, 1987, Cl. 53/390, FISH BAIT TIER, Nori Nakata, et al., Owner of Record: *Inventor,* Attorney or Agent: Philip K. Fitzsimmons, Ex. Gp.: 321

4,608,785, Re. S.N. 105,365, Filed Oct. 7, 1987, Cl. 52/2, ENVIRONMENTALLY CONTROLLED BUILDING, James A. Rhodes, et al., Owner of Record: *Said Assor to James A. Rhodes, Columbus, Ohio,* Attorney or Agent: Joseph A. Degrandi, et al., Ex. Gp.: 354

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

4,125,698, Reexam. No. 90/001,355, Requested: Oct. 16, 1987, Cl. 526/159, POLYMERIZATION OF ETHLYENICALLY UNSATURATED HYDROCARBONS, Karl Ziegler, et al., Owner of Record: *Studiergesellschaft Kohle mbH, Ruhr, W. Germany,* Attorney or Agent: Sprung, Horn, et al., Ex. Gp.: 150, Requester: Aristech Chemical Corp., Pittsburgh, Pa.

4,216,381, Reexam. No. 90/001,358, Requested: Oct. 15, 1987, Cl. 250/363, STRUCTURE FOR EMISSION TOMOGRAPHY SCINTILLATION CAMERA, Kai Lange, Owner of Record: *General Electric Co., Milwaukee, Wis.*, Attorney or Agent: Unknown, Ex. Gp.: 250, Requester: Owner

4,222,379, Reexam. No. 90/001,356, Requested: Oct. 16, 1987, Cl. 128/214, MULTIPLE BLOOD BAG HAVING PLASTICIZER-FREE PORTIONS AND A HIGH BLOOD COMPONENT SURVIVAL RATE, Dale A. Smith, Owner of Record: *Baxter Travenol Laboratories, Deerfield, Ill.*, Attorney or Agent: Unknown, Ex. Gp.: 220, Requester: Owner

4,492,669, Reexam. No. 90/001,354, Requested: Oct. 20, 1987, Cl. 419/5.000, METHOD AND MEANS FOR MAKING A BERYLLIUM MIRROR, Gerald Gould, Owner of Record: *Perkins-Elmer Corp., Norwalk, Conn.*, Attorney or Agent: Thomas P. Murphy, Ex. Gp.: 220, Requester: Ronald Grudziecki, Arlington, Va.

4,653,378, Reexam. No. 90/001,357, Requested: Oct. 22, 1987, Cl. 84/423, PEDAL KEYBOARD FOR ELECTRONIC MUSICAL INSTRUMENT, Keisuke Watanabe, et al., Owner of Record: *Nippon Gakki Kabushiki Kaisha, Shizuoka, Japan,* Attorney or Agent: Blakely, Sokoloff, et al., Ex. Gp.: 210, Requester: Owner

Errata

"All reference to Patent No. 4,699,440, to Ronald A. Wilson, of Mass., for 'ELECTRICAL CONNECTOR', appearing in the Official Gazette of Oct. 13, 1987, should be deleted since no patent was granted."

"All reference to Patent No. 4,701,346, to Shigenori Tamaki, et al., of Japan, for 'METHOD FOR COATING METAL PART WITH SYNTHETIC RESIN', appearing in the Official Gazette of Oct. 20, 1987, should be deleted since no patent was granted."

"All reference to Patent No. 4,701,761, to John Affinito, of Calif., for 'MEANS FOR SUPPRESSING REFLECTION OF ELECTROMAGNETIC RADIATION', appearing in the Official Gazette of Oct. 20, 1987, should be deleted since no patent was granted."

"All reference to Patent No. 4,701,791, to Duncan MacPherson, of Calif., for 'SYSTEM AND METHOD FOR MAPPING GEOSYNCHRONOUS REAL IMAGE DATA INTO IDEALIZED IMAGE', appearing in the Official Gazette of Oct. 20, 1987, should be deleted since no patent was granted."

Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Downs-Clark, Inc., Brownwood, Tex., Reg. No. 901,722, for the mark "RUFNECK" and design, Canc. No. 16,235.

Phil Maid, Inc., Chicago, Ill., Reg. No. 1,027,397, for the mark "PM", Canc. No. 16,145.

ERMA S. BROWN,
Administrator
of the Trademark Trial
and Appeal Board.
For MARGARET M. LAURENCE,
Assistant Commissioner
for Trademarks.

Status of PTO Services

The following is an update of the status of PTO services for October 1987:

Service Item	FY 1987 Goal (Calendar Days*)	Monthly Average (Calendar Days*)
Filing Receipts:		
Patents	22	25
Trademarks	30	64**
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	17 Hours
Window Coupons	5	2
Mail Coupons	12	5
Letter Orders	16	11
Certified Copies:		
Trademark Registrations	21	27
Applications-As-Filed	17	17***
File-Wrapper/Contents	N/A	25
Walk-up Certification	1	2
Trademark Search Library:		
Filing Pending Marks	21	43
Filing Reg. Certificates	Issue Date	Issue Date
Assignments:		
Recording Patent Assignments	20	46 (see narrative)
Receipt Date of Patent Documents Returned		Sept. 11, 1987
Recording Trademark Assignments	20	20
Receipt Date of Trademark Documents Returned		Oct. 1, 1987
Avg. Days from Issue Fee Payment to Issue Date	90–100	87
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	On schedule
Patent Copies Available	95% on Issue Date	91% on Issue Date****
Trademark Copies Available	95% on Issue Date	99% on Issue Date

* Unless otherwise noted.
** Keying contractor delays.
*** The 5% of orders for which fiche are not on site are not included in calculations.
**** Printer delivered copies late.

IMPROVEMENTS TO SERVICES

- *Express Lane Window Service* — On Oct. 16, 1987 the Correspondence and Mail Division (Mail Room) established an Express Lane for individuals having five or less documents to process at the Attorney's Window. The Express Lane will be available during the peak service hours of 3:30 p.m. to 5:00 p.m., or at any time there is a possibility that customers could be delayed. This extra service is being provided as a result of a suggestion from a patent attorney.

- *Patent Assignments* — The increase in the days to process patent assignments reflects the working off of a larger backlog of old assignments which involved more than 99 properties. This backlog has now been eliminated.

HELPFUL HINTS

- *Special Boxes for Mail* — As suggested by a patent attorney, we are republishing this notice regarding the use of special boxes for PTO mail. Henceforth, this notice will appear regularly in the Official Gazette. Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these special boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box_____
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Box 3	Mail for the Office of Personnel from NFC.
Box 4	Mail for the Office of Legislation and International Affairs.
Box 5	"No fee" mail related to trademarks (e.g. amendments to applications and request for extensions of time to file an opposition). Mail directed to the Trademark Trial and Appeal Board should have "Attention TTAB" on the envelope in addition to "Box 5".
Box 6	Mail for the Office of Procurement.
Box 7	Reissue applications for patents involved in litigation and any subsequently filed papers for those applications.
Box 8	All papers for the Office of the Solicitor.
Box 9	Coupon orders for the U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box AF	Amendments or responses to final rejections in patent applications, submitted under the expedited processing program.
Box FWC	Mail related to File Wrapper and Continuations.
Box Interference	Communications relating to interferences and applications and patents involved in interferences.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to reexamination applications.

- *Mandatory Identifiers when Submitting Maintenance Fees* — Practitioners are reminded that a patent maintenance fee payment and any surcharge payment submitted must identify the patent to which it relates by at least *two mandatory identifiers* [see 37 CFR 1.366(c)]:

  1. The patent number; and
  2. The serial number of the United States application for the patent on which the maintenance fee is being paid.

  Reissue patent maintenance fee due dates are based on the issue date of the original, rather than the reissue patent. The payment must identify the reissue patent by reissue patent number and reissue application serial number as the two mandatory identifiers and should also include the original patent number, the original patent issue date and the original United States application filing date. See 37 CFR 1.366(d).

  The mandatory identifiers are required as a minimum to enable a cross-check to be made to avoid errors in crediting payment of maintenance fees.

  It is suggested that the payment identify the fee being paid for each patent as to whether it is the 3½, 7½ or 11½ year fee; whether small entity status is being changed or claimed; the amount of the maintenance fee and any surcharge being paid; any assigned payor number; the patent issue date; and the United States application filing date. See 37 CFR 1.366(d).

  Failure to provide at least the two above-named mandatory identifiers will likely result in the non-acceptance of the maintenance fee payment. The date the two mandatory identifiers and the required fee are submitted is the date the maintenance fee payment is credited as being made.

- *Delayed Payment of Maintenance Fees* — Payment of any maintenance fee due on a patent after expiration of the patent may be accepted if the conditions set forth in 37 CFR 1.378 are satisfied.

  In the past, petitions under 37 CFR 1.378 to accept delayed payment of the maintenance fee in an expired patent have been filed which allege, as a basis for unavoidable delay: (1) lack of knowledge that a maintenance fee was due and/or (2) failure to receive a Maintenance Fee Reminder notice from the PTO.

  Practitioners are reminded that a patentee's lack of knowledge of a requirement to pay a maintenance fee does not constitute a showing of unavoidable delay; see 49 F.R. 34716 at page 34720, and 1046 O.G. 28 at page 32.

  Maintenance Fee Reminder notices are mailed only as a courtesy after the "grace period" has begun; see 37 CFR 1.362(e). Patentees are expected to maintain their own docket systems to ensure timely payment of maintenance fees, preferably during the "window period"; see 37 CFR 1.362(d). Since patentees are expected to maintain their own docket systems for timely payment of maintenance fees, proof that a Maintenance Fee Reminder notice was not received from the PTO does not constitute a showing of unavoidable delay; see 49 F.R. 34716–34726, and 1046 O.G. 28–37.

  Practitioners are cautioned that any petition to accept delayed payment of a maintenance fee under CFR 1.378 must include an enumeration of the steps taken to ensure timely payment of the maintenance fee. In this regard, the petition should include a detailed explanation of the docket system employed to ensure such timely payment. Any petition filed more than six months after the expiration of a patent will also be required to show that the

failure to timely pay the maintenance fee was due entirely to circumstances outside the control of the patentee and those acting on behalf of the patentee.

- *Correspondence Address and/or Fee Address of Maintenance Fees* — Practitioners are reminded that when no separate "fee address' under 37 CFR 1.363 has been supplied, the "correspondence address" of record under 37 CFR 1.33 will be used for correspondence relating to maintenance fees. A similar reminder appears on the Issue Fee Transmittal Form (PTOL–85(b)).

  Practitioners should maintain a current "correspondence address" and, if desired, a separate current "fee address" during the enforceable life of the patent in order to ensure receipt of correspondence regarding maintenance fee.

  In the case where a practitioner does not intend to continue representing the patentee, a request for permission to withdraw pursuant to 37 CFR 1.36 must be approved by the Commissioner.

  Practitioners are reminded that they should inform a client or former client (or timely notify the Office of an inability to notify a client or former client) of any maintenance fee correspondence received from the PTO. See 37 CFR 10.23(c)(8). This is similar to the practice with respect to interferences and reexamination proceedings.

- *Public Availability of Maintenance Fee Petitions/Decisions* — Maintenance fee petitions and decisions thereon are public records. Copies thereof can be obtained by submitting a written request to the Certification Branch. The request should state the patent number and serial number. The charge for the copies is currently $.50 per page.

  Direct questions on these maintenance fee notices to:

  Al Lawrence Smith
  Director, Group 350
  (703) 557–3414

- *Subscription Services* — When submitting changes to subscription accounts, allow approximately two months from the date mailed to the Patent and Trademark Office for changes to become effective. The reason for the two month delay is to allow for changes to be recorded, data entered, and the automated system to be updated.

Oct. 2, 1987.

THERESA A. BRELSFORD,
Assistant Commissioner
for Administration.

PATENT NOTICES

Certificates of Correction for the Week of Nov. 24, 1987

Re. 32,182	4,648,074	4,671,541	4,679,625
D. 290,140	4,649,108	4,671,566	4,679,672
4,322,416	4,649,404	4,672,243	4,679,792
4,372,034	4,651,187	4,672,505	4,679,918
4,535,950	4,651,569	4,673,053	4,680,047
4,542,307	4,654,322	4,673,107	4,680,126
4,569,590	4,654,585	4,673,119	4,680,272
4,591,884	4,654,808	4,673,468	4,680,336
4,592,808	4,655,179	4,673,662	4,680,475
4,596,721	4,655,258	4,673,739	4,680,622
4,598,986	4,658,302	4,673,914	4,680,948
4,602,800	4,659,676	4,673,956	4,681,154
4,608,900	4,659,736	4,674,508	4,681,197
4,612,720	4,661,358	4,674,828	4,681,226
4,615,037	4,661,483	4,674,861	4,681,332
4,616,216	4,662,483	4,675,061	4,681,605
4,616,331	4,662,796	4,675,273	4,682,224
4,617,490	4,662,825	4,675,354	4,682,489
4,619,518	4,662,838	4,675,667	4,682,656
4,621,183	4,662,884	4,675,789	4,682,713
4,621,925	4,662,925	4,676,248	4,682,891
4,625,821	4,663,049	4,676,396	4,683,009
4,630,083	4,663,455	4,676,662	4,683,296
4,631,285	4,663,529	4,676,832	4,683,321
4,631,660	4,664,120	4,676,974	4,683,918
4,632,973	4,664,126	4,677,015	4,683,955
4,633,068	4,665,016	4,677,117	4,684,042
4,639,356	4,665,266	4,677,778	4,684,162
4,640,612	4,665,268	4,677,935	4,684,170
4,641,476	4,665,355	4,678,347	4,684,564
4,642,768	4,666,999	4,678,451	4,684,717
4,643,722	4,667,661	4,678,478	4,685,119
4,643,756	4,668,195	4,678,496	4,685,152
4,644,056	4,669,693	4,678,868	4,685,239
4,645,417	4,669,883	4,679,008	4,685,459
4,645,430	4,670,525	4,679,197	4,685,867
4,647,331	4,670,587	4,679,475	
4,647,558	4,671,080	4,679,535	

Disclaimer

3,655,201.—*Larry D. Nichols,* Arlington, Mass. PATTERN FORMING PUZZLE AND METHOD WITH PIECES ROTATABLE IN GROUPS. Patent dated Apr. 11, 1972. Disclaimer filed Sept. 24, 1987, by the assignee, *Moleculon Research Corp.*

Hereby enters this disclaimer to claim 6 of said patent.

4,531,746.—*John K. Amdall* and *Benny Ballheimer,* Peoria, Ill. DUAL LABYRINTH FLUID SEAL WITH FLUID SLINGER. Patent dated July 30, 1985. Disclaimer filed Aug. 10, 1987, by the assignee, *Caterpillar, Inc.*

Hereby enters this disclaimer to claims 1 and 2 of said patent.

4,572,210.—*Robert J. McKinnon,* Franktown, Colo. SYRINGE WITH MEANS FOR ALLOWING PASSAGE OF AIR WHILE PREVENTING THE PASSAGE OF BLOOD TO OBTAIN A GAS-FREE BLOOD SAMPLE. Patent dated Feb. 25, 1986. Disclaimer filed Sept. 28, 1987, by the assignee, *Marquest Medical Products, Inc.*

Hereby enters this disclaimer to claims 1, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24 and 26 of said patent.

4,642,530.—*Enrique Rodriguez-Cavazos,* Indianapolis, Ind. RASTER DISTORTION CORRECTION CIRCUIT. Patent dated Feb. 10, 1987. Disclaimer filed Sept. 8, 1987, by the assignee, *RCA Corp.*

Hereby enters this disclaimer to claims 1–5 and 9 of said patent.

4,653,137.—*Eugene Fleischhauer,* Midlothian, Va. VACCUM CLEANER ATTACHMENTS. Patent dated Mar. 31, 1987. Disclaimer filed June 15, 1987, by the *inventor.*

The term of this patent subsequent to Jan. 27, 2004, has been disclaimed.

Disclaimer and Dedication

4,395,045.—*Ralph H. Baer,* Manchester, N.H. TELEVISION PRECISION TARGET SHOOTING APPARATUS AND METHOD. Patent dated July 26, 1983. Disclaimer and Dedication filed Sept. 3, 1987, by the assignee, *Sanders Associates, Inc.*

Hereby disclaims and dedicates to the Public claims 1–3 and 7–13 of said patent.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext. 21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 261-2907
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7140
Arkansas	Little Rock: Arkansas State Library	(501) 371-2090
California	Irvine: University of California, Irvine Library	(714) 856-7234
	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2347
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami–Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis–Marion County Public Library	(317) 269-1741
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4222
Nebraska	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nevada	Reno: University of Nevada Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-7040
	Buffalo and Erie County Public Library	(716) 846-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia: Free Library	(215) 686-5330
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-8726
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Vanderbilt University Library	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 257-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

All of the above-listed libraries offer CASSIS (Classification And Search Support Information System), which provides direct, on-line access to Patent and Trademark Office data.

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF October 24, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	9-11-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-27-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-29-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	2-18-86
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	10-14-85
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	2-05-85
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	5-24-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	9-06-85
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	5-02-86
DESIGN, GROUP 290—K. L. CAGE, Director	1-18-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	9-12-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-04-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-15-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	2-06-87
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-02-87

Expiration of patents: The patents within the range of numbers indicated below expire during October 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,531,806 to 3,537,106, inclusive

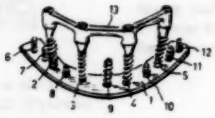
Plant Patents ..... Numbers 2,991 to 2,995 inclusive

REEXAMINATIONS

NOVEMBER 24, 1987

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,516,937 (786th)
SYSTEM FOR DENTURE SUPPORT USING A TRANSMANDIBULAR IMPLANT
Hans Bosker, Essen 14, 9751 NC Haren, Netherlands
Reexamination Request No. 90/000,861, Sep. 18, 1985.
Reexamination Certificate for Patent No. 4,516,937, issued May 14, 1985, Ser. No. 556,520, Nov. 30, 1983.
Int. Cl.[4] A61C *8/00*
U.S. Cl. 433—173



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 2 is cancelled.

Claims 1 and 3 are determined to be patentable as amended.

Claims 4–15, dependent on an amended claim, are determined to be patentable.

1. An apparatus providing support on the lower jaw for a submaxillary denture characterized by a base plate comprising an arcuate metal strip having an intermediate portion, the centerline of which in plan view [bring] *being* an arc across a subtending chord approximately 34 mm in length and with a height of approximately 8 to 10 mm; a bridging means comprising hooking means for coupling means included in a submaxillary denture;

a set of *at least four* posts to stand on said intermediate portion for carrying said bridging means, *said posts being independent from said base plate and adjustably positionable with respect thereto*;

a fixing means for each of said posts to fix said bridging means *and to fixedly secure said posts in place*; and a set of cortical screws to adjoin said base plate fixedly to the lower face of the lower jaw at locations on either side of each of said posts, *said posts further including means at the base ends thereof for securement to the base plate and means at the head end thereof for said fixing means.*

REEXAMINATIONS

NOVEMBER 24, 1981

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,546

APPARATUS FOR SECURING AN ELECTRONIC UNIT TO AN AVIONICS TRAY

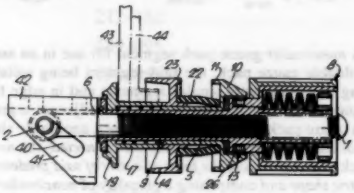
Joseph C. Roake, Lyme, near Chertsey, England, assignor to Barry Wright Corporation, Newton Lower Falls, Mass.

Original No. 4,506,439, dated Mar. 26, 1985, Ser. No. 528,903, Sep. 1, 1983. Application for reissue Dec. 3, 1985, Ser. No. 750,113

Claims priority, application United Kingdom, Sep. 3, 1982, 8225126; Sep. 3, 1982, 8225138

Int. Cl.[4] F16H *27/02*

U.S. Cl. 74—89.15 **9 Claims**



1. Apparatus for removing and securing a plug-in electronic unit *or the like* from or to an avionics tray, which apparatus comprises

(i) a threaded spindle one end of which includes a transverse pin for pivotally mounting the spindle in a retaining member attached to or forming part of the avionics tray such that the spindle can move about the transverse axis of said pin but cannot rotate about its own axis;

(ii) a first sleeve having a first portion relatively remote from the transverse pin and having a second, internally threaded portion which is threaded onto the spindle, the internal diameter of the first portion being slightly greater than the external diameter of the spindle;

(iii) a first stop member formed in or attached to the end of the first sleeve nearest to the transverse pin;

(iv) a second stop member arranged to limit the movement of the first sleeve with respect to the spindle in a direction away from the transverse pin;

(v) a rotatable grip fitted about that end of the first sleeve remote from the transverse pin;

(vi) a second sleeve coaxial with, and positioned around the first sleeve and having at its end remote from the transverse pin a radial flange including a shoulder facing towards the transverse pin, and an annular recess which cooperates with the rotatable grip and the first sleeve to define an annular cavity around the first sleeve;

(vii) a torque limiting arrangement positioned in said annular cavity and serving to interconnect the rotating grip and the first sleeve such that rotation of the grip in the direction towards the transverse pin causes the first sleeve to move along the threaded portion of the spindle towards the transverse pin so long as the torque between grip and said first sleeve is less than a predetermined value;

(viii) a ring member including (a) a sleeve portion coaxial with and positioned for sliding movement on the outer surface of the second sleeve, (b) an internal surface open towards the transverse pin, and (c) a shoulder facing inwards, and capable of abutting, the shoulder of the second sleeve;

(ix) a third sleeve coaxial with and positioned for relative sliding movement over that part of the outer surface of the second sleeve nearest to the transverse pin, the third sleeve being retained at its end nearest to the transverse pin by the first stop member and having, at that end, (a) a radially inwardly facing abutment which holds the third sleeve away from the first sleeve and which defines in cooperation with the inner surface of the third sleeve the outer surface of the first sleeve and the end of the second sleeve, a sheath like cavity around the first sleeve, and (b) a radially outwardly extending flange, the other end of said third sleeve being in contact with the radially inward part of the taper ring;

(x) a resilient element located in said sheath-like cavity and arranged so as to tend to urge the second and third sleeves away from one another in the axial direction of the spindle;

(xi) a generally cylindrical, elastomeric spacer element held between the radial flange of the second sleeve and that end of the ring member remote from the transverse pin, the arrangement being such that when the ring member and said radial flange move towards each other, their respective shoulders come into abutment so as to retain the compressed elastomeric spacer element within a cavity defined between the ring member and said radial flange; and

(xii) means for urging the rotating grip towards the torque limiting arrangement.

Re. 32,547

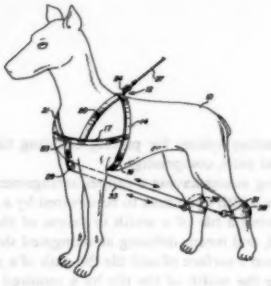
ANIMAL EXERCISING HARNESS

Robert C. Reed, 3314 N. 67th St., Scottsdale, Ariz. 85251, and Max Reed, 8437 E. Crestwood, Scottsdale, Ariz. 85253

Original No. 4,528,944, dated Jul. 16, 1985, Ser. No. 624,698, Jun. 26, 1984. Application for reissue Sep. 26, 1986, Ser. No. 911,882

Int. Cl.[4] A01K *15/02*

U.S. Cl. 119—29 **19 Claims**



14. An exercising device to be worn on a body, including in combination:

harness means for attachment to the chest region of the body, said harness means comprising a body encircling portion, a chest strap connected to said body encircling portion and extending over the front of the chest below the neck region, and connecting straps extending from said body encircling portion over the shoulders on opposite sides of the neck to said chest strap;

first and second leg bands for attachment to the legs; and

means for resiliently interconnecting said first and second leg bands with said chest strap of said harness means to cause added tension to be applied between the legs and the chest during walking and running, while at the same time permitting normal movement.

Re. 32,548
TILE PARTING DEVICES

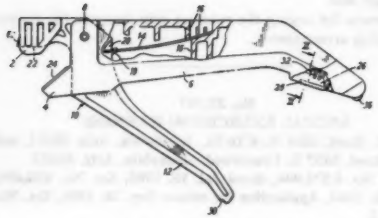
Paul S. Hepworth, Oadby, and Martin G. Whitehouse, Kibworth, both of England, assignors to Plas Plugs Ltd., Derby, England

Original No. 4,444,174, dated Apr. 24, 1984, Ser. No. 339,868, Jan. 18, 1982. Application for reissue Feb. 12, 1987, Ser. No. 13,951

Claims priority, application United Kingdom, Jan. 16, 1981, 8101400

Int. Cl.[4] B26F *3/00*; B28D *1/32*

U.S. Cl. 125—23 T **9 Claims**



1. A tile parting system for parting cladding tiles along a pre-determined path, comprising:

(a) measuring means having a caliper arrangement for measuring the width of an area to be covered by a tile, means for receiving a tile of a width in excess of the width so measured, and means defining an elongated slot, for indicating upon a surface of said tile the path of a parting line to reduce the width of the tile by a required amount at least as great as the excess width; and

(b) scoring and parting means including a cutting edge, said cutting edge selectively insertable through said slot such that said tile may be scored along said parting line path by said cutting edge, and jaw members movably disposed in said scoring and parting means and having a chevron-shaped tile-receiving opening.

Re. 32,549
FOLDABLE METALLIC GAUZE PACK AND SEGMENT

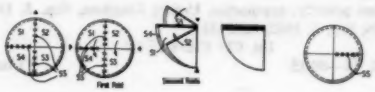
David C. Bishop, London, and Alan E. Heywood, St. Albans, both of England, assignors to Johnson Matthey & Co., Limited, London, England

Original No. 4,351,887, dated Sep. 28, 1982, Ser. No. 143,480, Apr. 22, 1980. Application for reissue Sep. 24, 1984, Ser. No. 653,823

Claims priority, application United Kingdom, May 3, 1979, 7915468

Int. Cl.[4] B32B *3/04*

U.S. Cl. 428—594 **10 Claims**



1. A *noncircular* gauze pack segment for use in an assembly of a foldable gauze pack, the said segment being suitable for locating in a plane with similar segments and in edge to edge contiguous relationship with at least one adjacent segment to form a gauze pack having a predetermined geometric shape, *in which at least two adjacent segments are connected;* the *noncircular* pack segment *having the form of a part of said predetermined geometric shape and* comprising a plurality of *noncircular* superposed gauze segments having, at least when assembled *into a pack segment,* substantially identical shape and area and *being* held in fixed relationship one with another, [in which at least two adjacent segments are hingeably connected,] alternate gauze segments being woven from a first metallic material with a gauze segment woven from a second metallic material being interleaved between said alternate gauze segments[, each said gauze segment having the form of a sector of a circle].

Re. 32,550
HALOPHENOXY BENZAMIDE HERBICIDES

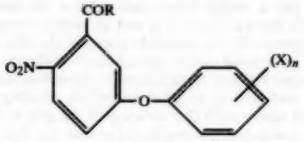
Robert J. Theissen, Westfield, N.J., assignor to Rhone-Poulenc Agrochimie, Lyons, France

Original No. 3,839,444, dated Oct. 1, 1974, Ser. No. 5,334,528, Feb. 22, 1973. Continuation-in-part of Ser. No. 194,481, Nov. 1, 1971, abandoned, which is a division of Ser. No. 819,412, Apr. 25, 1969, Pat. No. 3,652,645. Application for reissue Sep. 14, 1979, Ser. No. 75,367

Int. Cl.[4] C07C *103/26*

U.S. Cl. 564—166 **3 Claims**

1. An herbicidal compound having the formula:



wherein X is halogen, n is 1 to 5, and R is amido, alkylamido [$(C_1—C_6)$] $(C_1—C_3)$, or dialkylamido [$(C_1—C_6)$] $(C_2—C_6)$*wherein each alkyl of the dialkylamido contains 1 to 3 carbon atoms.*

PATENTS

GRANTED NOV. 24, 1987

ERRATA

For CLASS	See PATENT NO.
437-109	4,707,909
043-017	4,707,932
212-182	4,708,251
439-095	4,708,412
439-358	4,708,413
439-394	4,708,414
439-633	4,708,415
439-851	4,708,416
439-828	4,708,417
439-785	4,708,418
437-019	4,708,747
437-018	4,708,767
437-228	4,708,768
512-012	4,708,821
436-112	4,708,923
380-020	4,709,266

PATENTS

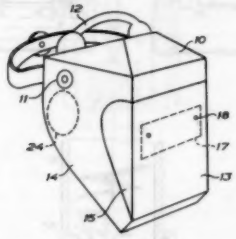
GRANTED NOV. 24, 1987

PATENTS

GRANTED NOVEMBER 24, 1987

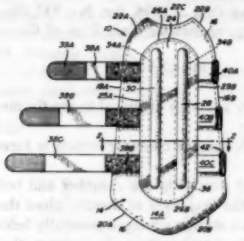
GENERAL AND MECHANICAL

4,707,860
WELDING SHIELD
Per-Olof Holmström, Wälluf 40, Paarp, Sweden S-260 33
Continuation of PCT SE84/00103, Mar. 22, 1984, published as W84/03621, Sep. 27, 1984
This application Nov. 21, 1984, Ser. No. 674,401
Claims priority, application Sweden, Mar. 24, 1983, 83016253
Int. Cl.[4] A61F *9/06*
U.S. Cl. 2—8 **8 Claims**



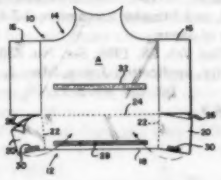
1. Welding shield adapted to be located in front of the face of the welder for protection against harmful radiation, comprising a dark welding glass, a highly light-reflecting layer and a UV-absorbing layer together forming a transparent planar panel which extends beyond the top, bottom and side edges of the welding glass, and means mounting the welding glass to the backside surface of said panel, said welding glass forming a locally defined portion of the welding shield to be positioned in front of the eyes, surrounded by said panel.

4,707,861
FOREARM SHIELD PAD
Fernand Lavoie, 1305 Ile St., Jean - Apt. 3, Terrebonne, Quebec, Canada J6W 3M7, and Yves Lepine, 2557 Crescent Holon, Lachine, Quebec, Canada H7S 4C7
Filed Jan. 13, 1987, Ser. No. 2,987
Int. Cl.[4] A41D *13/08*
U.S. Cl. 2—16 **13 Claims**



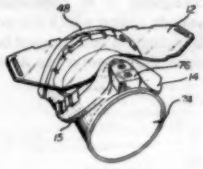
1. A protective device for protecting a person from battery following assault, the device comprising: a sturdy, rigid, elongated plate; a sheath surrounding said plate and made of a shock-dampening material; strap members to releasably connect the plate sheath to a limb of the person, and extending transversely of the longitudinal axis of said plate; and a resilient channel member fixedly mounted to the exterior face of said plate sheath, and extending longitudinally of said plate; said channel member adapted to receive a rigid stick applied against said exterior face to prevent its lateral displacement relative to said plate.

4,707,862
CONVERTIBLE OUTERWEAR GARMENT
Terry L. Gerber, South Bend, Ind., assignor to Ashley Worldwide, Inc., Mishawaka, Ind.
Filed Feb. 19, 1987, Ser. No. 16,330
Int. Cl.[4] A41D *1/00*
U.S. Cl. 2—93 **9 Claims**



1. A jacket, comprising:
an upper body portion having back and side jacket panels;
a lower extension portion having at least two extension panels, at least one said extension panel being foldable onto another said extension panel; and
first fastener means for releasably securing said lower extension portion to said back jacket panel in a folded position, and sub-connecting means for detachably connecting said lower extension portion to said upper body portion, such that said lower extension portion forms an extension of said upper body portion when connected to said upper body portion.

4,707,863
ANTI-FOG GOGGLE WITH FOAM FRAME
Joseph R. McNeal, Ketchum, Id., assignor to Scott USA Limited Partnership, Ketchum, Id.
Continuation-in-part of Ser. No. 460,510, Jan. 24, 1983, Pat. No. 4,571,748. This application Feb. 19, 1986, Ser. No. 832,103
Int. Cl.[4] A61F *9/02*
U.S. Cl. 2—436 **40 Claims**



1. A goggle comprising:
a transparent, normally planar lens member deformed into a desired curvature, said lens member having a centrally located viewing area and non-viewing upper and lower peripheral areas;
a normally planar semi-rigid support member for supporting said lens member and secured to said lens member and conforming to said desired curvature, said support member extending inwardly from the non-viewing areas of the lens member towards the face of the wearer of the goggle and having means disposed adjacent the upper and lower non-viewing areas of the lens member for forming, with portions of said upper and lower lens areas, respective upper and lower air channels to allow air to enter and exit the interior of the goggle between the lens and air channel forming means of the support member; and
adhesive securing means for maintaining said lens member

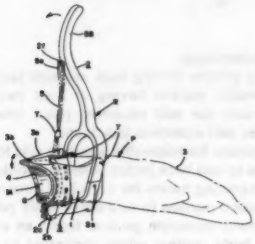
and said support member secured together in said desired curvature, the combination of said lens member and said support member secured together providing the goggle with curvature that is self-sustaining.

4,707,864

SANITARY URINE COLLECTING APPARATUS

Hideaki Ikematsu, 7-12-17 Suzurandai-kitamachi, Kita-ku, Kobe 651-11, and Masako Kawamoto, 2-3-45 Ohtsuka, Miki 673-04, both of Japan

Filed Feb. 28, 1986, Ser. No. 835,100
Claims priority, application Japan, Mar. 2, 1985, 60-41556
Int. Cl.[4] A47K *11/00*
U.S. Cl. 4—144.3 **12 Claims**



1. A sanitary device generally comprising a urine receiver and a urine bag means removably attached thereto, said urine receiver comprising a receiver body open at both ends thereof, said urine bag means being positioned in said receiver body and extending through said open ends, said receiver further comprising a receiver frame connected to rotatably support said receiver body by pivot pins, grip means at a lower end of said frame, and a grip handle portion disposed at the upper end thereof, said urine bag means comprising a hollow element open at one end thereof and fitted with an elastic, hygroscopic abutting member configured to be complementary for the inguinal region of the body against which it is to be abutted and adapted to be accommodated in said receiver body to thereby prevent leakage of urine during use of the device.

4,707,865

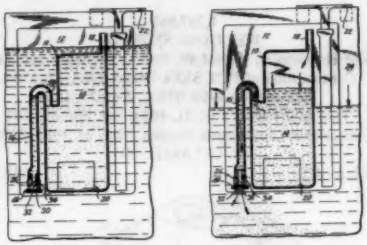
DISPENSER WITH FLUID PATHWAY INCLUDING VALVE TO FORM AIR LOCK

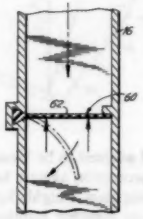
Clifford J. Ludwig, Southgate, Ky., and Anthony D. Delia, West Redding, Conn., assignors to The Drackett Company, Cincinnati, Ohio

Filed Jul. 31, 1986, Ser. No. 891,708
Int. Cl.[4] E03D *9/02*
U.S. Cl. 4—228 **4 Claims**

1. In a dispenser for the controlled-rate release of a substance into a toilet tank, said dispenser having an inlet/outlet means for alternately receiving and discharging liquid into and from said dispenser, said inlet/outlet means being a single conduit, said dispenser having an air vent tube for communicating the interior of said dispenser to atmospheric pressure, the improvement comprising:

valve means situated in the water flow path within said dispenser for restricting the flow of water into said dispenser during the filling cycle of said dispenser in order to enable the formation of an air bubble in said inlet/outlet means to prevent fluid communication between the interior and exterior of said dispenser during quiescent periods.





4,707,866

DEVICE FOR ADDING DISINFECTANTS OR THE LIKE TO THE FLUSHING WATER OF A WC

Fritz von Philipp, and Horst Hautmann, both of Neuburg, Fed. Rep. of Germany, assignors to Globol Werk GmbH, Neuburg, Fed. Rep. of Germany

Filed Dec. 3, 1986, Ser. No. 937,256
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1985, 3542944
Int. Cl.[4] E03D *9/02*
U.S. Cl. 4—228 **6 Claims**

1. A device for adding a chemical to the flushing water of a WC comprising:

a first layer defining a chamber which is formed by deep drawing;

a second layer overlying the chamber and being sealingly secured to the first layer to thereby close the chamber;

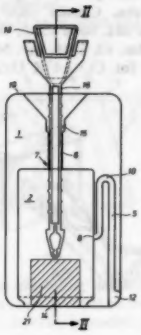
at least one foot section arranged generally below the chamber and defined by a section of a lower wall portion forming a part of the chamber and by an edge of the second layer, the lower wall portion extending generally downwardly at a slant from the second layer and terminating at the section which substantially corresponds in height to that of the edge;

the first layer and the second layer being made from a water-resistant material, the second layer being provided with print on at least one of its two surfaces before it is secured to the first layer;

an elongated mmounting hook including a base portion;

a generally upwardly extending passage defined by the first and second layers communicating the chamber with the

exterior and adapted to receive and hold the base portion of the elongated mounting hook and permitting the flow



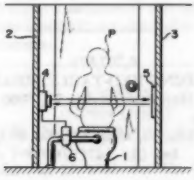
of liquid through the passage when the base portion is disposed therein.

4,707,867

TOILET-FLUSHING CONTROL APPARATUS

Ryoichi Kawabe, Kamagaya; Tetsuo Iwasaki, Tokyo; Hiroshi Kozuru, Noda; Masashi Yoda, Tokyo; Masakazu Matsunaga; Takesi Takamori, both of Asaka, and Matao Nakasima, Kawagoe, all of Japan, assignors to F.M. Valve Manufacturing Co., Ltd., Saitama, Japan

Filed Dec. 11, 1986, Ser. No. 940,413
Claims priority, application Japan, Dec. 18, 1985, 60-282754
Int. Cl.[4] E03D *13/00*
U.S. Cl. 4—313 **6 Claims**



1. An apparatus for automatically controlling the flushing of a toilet, said apparatus comprising:

detector means located in close proximity to said toilet is seated on said toilet, said detector means outputting a first signal upon detecting the presence of said toilet user;

a delay circuit connected to said detector means for receiving said first signal therefrom and outputting a second signal when said first signal of said detector means lasts longer than a predetermined period;

a judging circuit connected to said delay circuit for receiving said second signal therefrom, determining that the toilet user has urinated, when said second signal of said delay circuit lasts shorter than a reference time and outputting a first stand-by signal, and determining that the toilet user has defecated, when the output signal of said delay circuit lasts for the reference time or a longer time, thereby outputting a second stand-by signal;

a timer-starting circuit coupled to said delay circuit for receiving said second signal therefrom and outputting a start signal when said delay circuit ceases to output said second signal;

a first timer connected separately to said judging circuit and said time-starting circuit, for starting upon receipt of the start signal from said timer-starting circuit after receiving the first stand-by signal from said judging circuit, and for outputting a third signal until a lapse of time set to said first timer has expired;

a second timer connected separately to said judging circuit and said timer-starting circuit, for starting upon receipt of the start signal from said judging circuit after receiving the second stand-by signal from said judging circuit, and for outputting a fourth signal until a lapse of time set to said second timer has expired; and

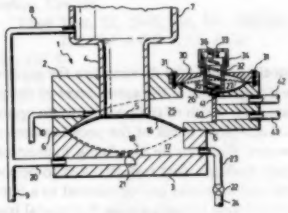
a flush value connected to said first and second timers for supplying water to the toilet for the time set to said first timer in response to the output signal of said first timer, or for the time set to said second timer in response to the output signal of said second timer.

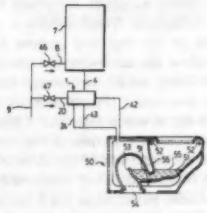
4,707,868

TOILET FLUSHING APPARATUS

Arnold Hennessy, Wellington, Canada, assignor to AHED Research and Development Inc., Ingleside, Canada

Filed May 27, 1986, Ser. No. 866,619
Claims priority, application Canada, Jun. 13, 1985, 483942
Int. Cl.[4] E03D *3/10*
U.S. Cl. 4—362 **10 Claims**





1. A diaphragm valve for an hydraulic flushing mechanism, said valve comprising:

(1) a first body portion, fastened to

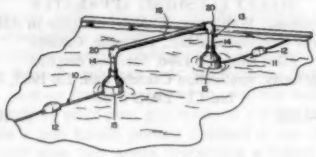
(2) a second body portion,
(3) a flexible diaphragm between the body portions which also separates, into two separate chambers, an enclosure formed by the two body portions,
(4) a discharge orifice from an adjacent tank of water maintained under pressure, said orifice protruding into the first of said chambers through said first body portion, having a discharge area smaller than the area of the first side of said diaphragm, and being adapted to be sealed by the diaphragm in a sealing position,
(5) inlet means through the second body portion, connected to a water supply at water main pressure, to supply water to the second of said chambers through a constricted aperture, the diaphragm being adapted to maintain its sealing position by water at water main pressure on the second side of the diaphragm in the second chamber,
(6) a release valve adapted to release water pressure in the second chamber and discharge same to atmospheric pressure through a discharge line, and
(7) at least two outlets from said first chamber to discharge water from the chamber, one of said outlets being adapted to communicate directly to a pressure flush toilet facility and another to an atmospheric pressure discharge.

4,707,869

SWIM THROUGH SAFETY DIVISION LINE FOR POOLS

O. Eugene Ray, P.O. Box 40302, St. Petersburg, Fla. 33743

Filed Jul. 16, 1986, Ser. No. 886,175
Int. Cl.[4] F04H *3/18*
U.S. Cl. 4—505 **8 Claims**



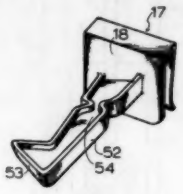
1. A swim-through safety division line for pools comprising:
a flexible division line at the water level of the pool extending across the width of the pool between opposite sides of the pool at a slope break of the pool between shallow and deep water, the division line being formed of two parts, each part having a first end attached to opposite sides of the pool and a second end connected to a buoyant frame,
said buoyant frame including a top horizontal frame member disposed far above the water level, a bottom horizontal frame member disposed far below the water level and two vertical side frame members extending between the top and bottom horizontal frame members and attached to opposite ends of the top and bottom horizontal frame members to allow the unobstructed passage of swimmers through the frame while swimming lengthwise of the pool, thereby precluding the necessity of swimming under water to pass the division line, and a pair of floats, each float attached coaxially to one of the vertical side frame members, the second ends of the division line extending through said floats and being connected to the opposite vertical side frame members at the level of the pool water surface, whereby the floats not only render the frame buoyant but also hold the division line on the water surface to thereby render the division line visible to swimmers in the pool.

4,707,870

TOILET SEAT OR COVER RETAINING DEVICE

Margaret M. Glassco, Apt. 12, Bldg. #3, 65 Swindon Way, Winnipeg, Manitoba, Canada (R3P 0T8), and John M. Glassco, P.O. Box 651, Soap Lake, Wash. 98851

Filed Mar. 13, 1986, Ser. No. 839,142
Int. Cl.[4] A47K *13/24*
U.S. Cl. 4—661 **3 Claims**



1. In combination with a toilet assembly which includes a toilet bowl, a water tank associated therewith and having an upper front edge, a toilet seat hinged at the rear side to the bowl and a cover selectively overlying the seat and also hinged to the bowl via the seat hinge, said seat and cover combination adapted to be moved either separately or together from a substantially horizontal position upon said bowl to a substantially vertical position against the front of said tank and vice-versa; a device for selectively and detachably retaining the seat and cover or cover per se, in the substantially vertical position against the front of the associated tank, said device comprising a resilient clip formed from synthetic plastic and having a front wall, a rear wall and a junction plate extending between the upper ends of said walls, the resiliency of the material forming said clip urging the lower end of said rear wall towards said front wall whereby said clip is adapted to grip the upper front edge of the water tank, when installed thereon, to resist sideways movement of said device along the upper front edge of the tank during use, a synthetic plastic stem extending perpendicularly from the plane of the front wall of said clip, a vertically situated living hinge formed along the length of said stem whereby the portion of said stem outboard of said hinge is adapted to deflect sideways in a substantially horizontal plane and to return to the original position when supported upon said water tank by said resilient clip, an engaging member formed on the distal end of said stem for detachably and selectively retaining the seat and cover or cover per se in the said vertical position, said member being in the form of a hook formed integrally with the stem and including a front camming surface and a rear, seat and cover or cover per se engaging surface, movement of said seat and cover or cover per se, towards the vertical position against the water tank, adapted to deflect said stem sideways as the seat and cover or cover per se engages said camming surface, said living hinge returning the outboard portion of said stem and said member towards the original position relative to said clip and engaging the edge of said seat or seat cover.

4,707,871

FOLDING BED-TABLE MEANS

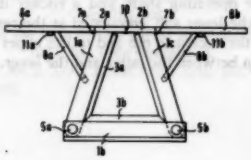
Adrian Pocanschi, Hauptmannsreute 94, 7000 Stuttgart 1, Fed. Rep. of Germany

Filed Jun. 12, 1986, Ser. No. 873,554
Int. Cl.[4] A47C *19/00*
U.S. Cl. 5—3 **2 Claims**

1. A folding bed-table means in which a sleeping means can be convverted into a table, a table with desk or a double desk, into a lounge, a lounge with table or a lounge with desk with the following parts:
(a) a base frame comprising a pair of elongated spaced parallel coextensive side members each having opposed free ends,

(b) extension members having opposed ends pivotally connected at one end to the free ends of each side member, the other ends of the extension members being interconnected by a rigid plate element,

(c) a table plate hinged to an outer end of each plate element, and



(d) a prop member extending between the table plate and extension member and pivoted to one of them to maintain the table plate in laterally extended position relative to the side member.

4,707,872

RESILIENT SUPPORTING DEVICE

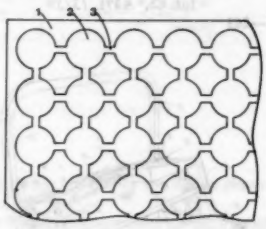
Lasse Hessel, Sjolundsparken 21, DK-3150 Hellebaek, Denmark

Filed Jul. 16, 1985, Ser. No. 755,570

Claims priority, application Denmark, Jul. 24, 1984, 3627/84

Int. Cl.[4] A47C *27/08*

U.S. Cl. 5—451 **5 Claims**



1. A resilient supporting device comprising a plurality of liquid-filled compartments having flexible walls, each of said compartments communicating with at least two other of said compartments via flow inhibiting passages, and each of said compartments being filled with a liquid having a viscosity higher than that of water, each of said passages having a cross-sectional area substantially less than that of each of said compartments and comprising two interconnected oppositely directed spiral paths such that, when liquid flows from one compartment to an adjacent compartment, flow direction of the liquid is turned about 180° when liquid flows from one spiral path into another, whereby said passages and said high viscosity liquid effect a substantial resistance against the flow of said liquid from loaded to non-loaded or slightly loaded ones of said compartments.

4,707,873

DOWN QUILT

Kuo A-Yan, 8-1 Fu Chung Road, 8 Lin Yushow Lee, Panchiao, Taipei Hsien, Taiwan

Filed Jul. 12, 1985, Ser. No. 754,408

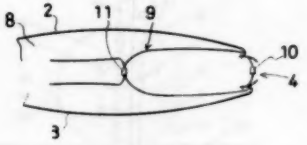
Claims priority, application Japan, Aug. 14, 1984, 59-123695[U]

Int. Cl.[4] A47G *9/02*

U.S. Cl. 5—502 **1 Claim**

1. A down quilt of the type in which a front side cloth and a back side cloth are sewn together along the peripheral edge region thereof and are also sewn with seam lines in a checkerboard fashion so as to define a plurality of feather-holding sections, and in which an opening is formed within a portion of said peripheral edge region which is not sewn together and through which opening a feather feeder nozzle can be inserted into the interior of said quilt, comprising:

a tubular closure section with one open end connected to said peripheral edge region of said quilt defining said opening and capable of being entirely accommodated within said interior of said quilt when said interior of said quilt has been filled with said feathers and withdrawn from said interior of said quilt when it is desired to fill said interior of said quilt with said feathers;



a first slide fastener provided upon said peripheral edge region of said quilt defining said opening for closing said opening and providing a continuum of said peripheral edge region of said quilt, and for opening said opening so as to permit said withdrawal of said closure section from said interior of said quilt; and

a second slide fastener provided upon said closure section, at an intermediate portion of said closure section as viewed in the lengthwise direction of said closure section, for opening and closing said closure section, whereby said second slide fastener is free from contact with said feathers disposed interiorly within said quilt so as to prevent the passage of said feathers through said second slide fastener and out from said quilt.

4,707,874

METHOD OF WATERPROOFING AN ARTICLE OF FOOTWEAR AND THE WATERPROOFED ARTICLE PRODUCED THEREFROM

Michel R. Champagne, Ile Bizard, Canada, assignor to Genfoot, Inc., Quebec, Canada

Filed Mar. 13, 1986, Ser. No. 839,064

Int. Cl.[4] A43B *7/12, 1/10*

U.S. Cl. 12—142 E **7 Claims**

1. A method of waterproofing a fabricated article of footwear comprising the steps of:

(a) coating selected inner surface areas of said article with a layer of polymeric solution comprising effective amounts of a polymeric material and solvent, said solution solidifying upon due exposure to ambient air, said selected areas being those sought to be waterproof, said coating step including the step of coating said inner surface from inside the article; and

(b) substantially air drying said layer of solution at ambient temperature.

4,707,875

HOLDING MEMBER FOR WORKING ELEMENTS OF ROLLER BRUSHES

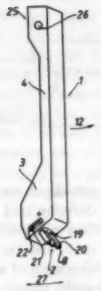
Johann Wachter, Mannsworth, Austria, assignor to Famag Fahrzeug- und Maschinenhandelsgesellschaft m.b.H. Nfg. KG., Vienna, Austria

Filed Aug. 6, 1985, Ser. No. 763,264

Claims priority, application Austria, Aug. 6, 1984, 2545/84; Nov. 5, 1984, 3498/84; Nov. 5, 1984, 3499/84; European Pat. Off., Jul. 24, 1985, 85890164

Int. Cl.[4] A46B *13/02*

U.S. Cl. 15—179 23 Claims



1. In a holding member for working elements of roller brushes for the treatment of traffic areas in order to remove from the surface thereof coatings such as dirt, snow, ice, paint, abraded rubber, and the like, several said holding members being distributed over the outer surface of a rotatable brush core and being pivotally mounted on the brush core about axes parallel to the axis of rotation of the brush, said holding member comprising a first end adapted to be mounted on the brush core, and second end comprising a radially outwardly located head (3) adapted to receive a said working element, and a shank (4) interconnecting said first and second ends; the improvement in which said first end comprises means for pivotally mounting said holding member on the brush core for pivotal movement about an axis parallel to the axis of rotation of the brush core, and said shank (4) comprises an elastically deformable member.

4,707,876

WINDSCREEN WIPER FOR MOTOR VEHICLES

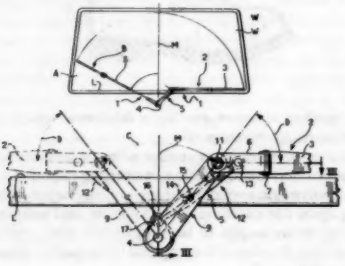
Carlo Carducci, Rome, Italy, assignor to Magneti Marelli S.p.A., Milan, Italy

Filed Jul. 24, 1986, Ser. No. 889,067

Claims priority, application Italy, Jul. 24, 1985, 48406 A/85

Int. Cl.[4] B60S *1/24, 1/32*

U.S. Cl. 15—250.23 5 Claims



1. Windscreen wiper for motor vehicles, comprising a motor driven operation shaft, a wiper arm driven by the operating shaft and a wiper blade carried by the wiper arm, wherein a transmission device is interposed between the wiper arm and the operating shaft and includes a lever having one end coupled for rotation to the operating shaft and the opposite end thereof articulated to the wiper arm, an eccentric pin fixed relative to the operating shaft, and a rocker link pivotably connected to the lever and articulated at the respective ends thereof about the eccentric pin and to the wiper arm close to the articulation between the latter and the lever.

4,707,877

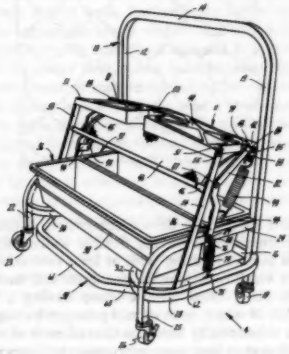
WET MOP LIQUID EXTRACTOR

Dana K. Griffin, Van Wert, Ohio, assignor to Tu-Way Products Company, Troy, Mich.

Filed Jun. 26, 1986, Ser. No. 879,146

Int. Cl.[4] A47L *13/59*

U.S. Cl. 15—261 7 Claims



1. A wet mop liquid extractor comprising:

(a) a support frame;

(b) a fixed, perforated, arcuately curved upwardly, pressure plate mounted on said support frame;

(c) a movable pressure plate, pivotally and arcuately movable, operatively mounted on said support frame in a position above said fixed pressure plate;

(d) means for moving said movable pressure plate from an initial position through a rolling, squeezing engagement with a wet mop placed on the fixed pressure plate so that pressure is applied against a small area of the mop at any one time to maximize the squeezing pressure on the mop to extract the liquid therefrom;

(e) means for exerting a downward pressure on the movable pressure plate when it is moved through a liquid extraction movement over a wet mop; and,

(f) means for returning said movable pressure plate to its initial position after liquid extractions movement.

4,707,878

VACUUM LOADING CLEANING SYSTEM

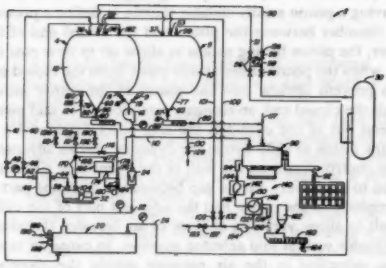
William G. Urbani, Stockton, Calif., assignor to Industrial Innovations, Inc., Stockton, Calif.

Continuation-in-part of Ser. No. 657,284, Oct. 2, 1984, Pat. No. 4,619,015, and a continuation-in-part of Ser. No. 662,880, Oct. 2, 1984, Pat. No. 4,616,337. This application Aug. 19, 1985, Ser. No. 767,008

The portion of the term of this patent subsequent to Oct. 28, 2003, has been disclaimed.

Int. Cl.[4] A47L 5/12; B08B 3/02, 3/10; B07C 5/00

U.S. Cl. 15—302 9 Claims



1. A surface cleaning system, for use with a cleaning liquid, comprising:

a substantially sealed pressure vessel having a liquid outlet, a vacuum outlet and a suction inlet in fluid communication with the interior of said vessel, said vacuum outlet and said suction inlet communicating with an upper region of said vessel and said liquid outlet communicating with a lower region of said vessel;

a first line;

first pump means, fluidly connected to said liquid outlet, for pumping the cleaning liquid from said vessel through the first line, said liquid partially filling said pressure vessel so that said vacuum outlet is above the free surface of said cleaning liquid;

means, fluidly connected to said vacuum outlet, for drawing a partial vacuum within said upper region of said pressure vessel;

a second line, fluidly connected to said suction inlet at one end to provide a source of suction at the other end of said second line, said other end coupled to a position at the surface to be cleaned so cleaning liquid and dislodged contaminants may be transferred from the surface to said vessel;

solids separator means, including an inlet, for removing solids from a mixture of solids and liquids;

pipe means for fluidly connecting the inlet of said solids separator means to said vessel, said pipe means adapted to pass a mixture of solids and said cleaning liquid from said vessel to said solids separator means; and

said solids separator means including a liquid outlet, fluidly coupled to the interior of said vessel, for drawing liquid from said solids separator means into said vessel.

4,707,879

DEVICE FOR ACTING ON AND TREATING SURFACES, FOR INSTANCE FOR PICKING UP PARTICLES, LEAVES AND LITTER

Stefan J. Moszkowski, Lomvägen 315, S-191 56 Sollentuna, Sweden

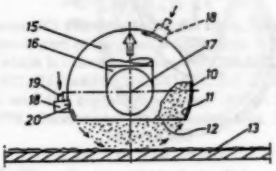
PCT No. PCT/SE85/00053, § 371 Date Oct. 8, 1985, § 102(e) Date Oct. 8, 1985, PCT Pub. No. WO85/03498, PCT Pub. Date Aug. 15, 1985

PCT Filed Feb. 5, 1985, Ser. No. 786,964

Claims priority, application Sweden, Feb. 10, 1984, 8400726

Int. Cl.[4] A47L 5/14

U.S. Cl. 15—345 11 Claims



1. A device for treating surfaces by means of a medium such as air, which is supplied to the device through at least one inlet and is sucked away through at least one outlet, said device comprising at least one suction chamber having an inner envelope surface which is so constructed that the medium entering through said inlet is circulated in the chamber, said envelope surface being provided with an opening and said medium acting on the treatment surface through said opening characterized in that

(a) said suction chamber is a vortex chamber substantially forming a part of a circular cylinder having a central axis which is substantially parallel to the treatment surface,

(b) said outlet being situated so as to effect an axial outflow along said central axis and a well-defined rotating vortex around said central axis, and

(c) the periphery of said rotating vortex having a full circular cylindrical configuration centered around said central axis, so that the treatment surface is tangential to said cylindrical configuration.

4,707,880

SWIVEL CASTER ASSEMBLY AND METHOD OF MAKING

Michael P. Doyle, Stratford; Francis J. Forte, Huntington, and Edward Galkowski, Shelton, all of Conn., assignors to Stewart-Warner Corporation, Chicago, Ill.

Filed Mar. 4, 1986, Ser. No. 836,127

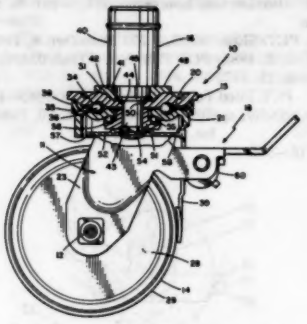
Int. Cl.[4] B60B 33/00

U.S. Cl. 16—38 12 Claims

1. A method of making a heavy duty swivel caster assembly of the type having a wheel supporting horn on which a swivel plate is rotatably mounted by an upwardly extending pintle, including the steps of; forming the swivel plate with a central aperture therein and an annular upper surface portion, forming a pintle with a downwardly facing shoulder, forming a deformable annular washer sized to fit within and engage the swivel plate annular upper surface portion and placing it on the pintle in engagement with the pintle shoulder, pressing the pintle downwardly in the swivel plate aperture with sufficient force to deform the washer against the annular surface portion to radially lock the washer against the swivel plate, and attaching the pintle, washer and swivel plate to the horn.

10. A swivel plate type caster, comprising: a "U" shaped horn adapted to carry a wheel including an upper aperture therein, a swivel plate rotatably mounted on top of the horn and having an annular surface projecting sharply upwardly from its upper surface and having a central aperture therein, shaft means extending through the central aperture in the swivel plate and the horn to axially lock them together while

permitting relative rotational movement, and a deformable powdered metal washer deformed by force pressing the washer against the swivel plate annular surface between the



shaft means and the swivel plate annular surface to radially lock the shaft means with respect to the swivel plate even with minor inaccuracies in swivel plate manufacture.

4,707,881

LUGGAGE CASE AND WHEEL ROLLER OR CASTER ASSEMBLY THEREFOR

Willibald Van Hoye, Zwijnaarde, Belgium, assignor to Samsonite Corporation, Denver, Colo.

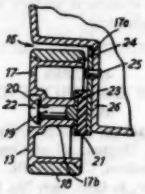
PCT No. PCT/EP85/00482, § 371 Date May 5, 1986, § 102(e) Date May 5, 1986, PCT Pub. No. WO86/01383, PCT Pub. Date Mar. 13, 1986

PCT Filed Sep. 6, 1985, Ser. No. 867,187

Claims priority, application European Pat. Off., Sep. 6, 1984, 84306082.3

Int. Cl.[4] B60B *33/00*

U.S. Cl. 16—44 **6 Claims**



1. A luggage case comprising a shell, said shell having recesses located at a corner, wheels rotatably mounted to said shell, said wheels being mounted at said corner of said shell on cantilever stub axles passing through the center of each wheel, each of said axles including a flange positioned laterally inward from the innermost edge of each said wheel, a resilient shock absorbing member attached to a surface of said flange, at least a portion of said resilient shock absorbing member being positioned laterally inward of the inner edge of said wheel and within the overall axial width of the wheel, said resilient shock absorbing member means being fastened in turn to a mounting plate for securing said wheel and axle to said shell such that said wheel is mounted in said recess in said shell a portion of the shell overhanging the ground engaging portion of said wheel, such that the spacing between the shell and the ground engaging portion of said wheel is less than the maximum deflection of the wheel and axle assembly about the resilient shock absorbing means, whereby the wheel makes contact with the over-hanging portion of the shell when the wheel is subjected to severe shock.

4,707,882

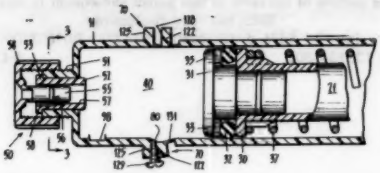
PNEUMATIC DAMPER

John R. Watts, 87 Well Street, Middle Brighton, Victoria 3186, Australia

Filed Mar. 10, 1986, Ser. No. 837,684

Int. Cl.[4] E08F *3/00*

U.S. Cl. 16—66 **17 Claims**



1. A pneumatic damper comprising a cylinder closed at one end having a piston axially slidable therein to define a pressurizable chamber between the piston and the closed end of the cylinder, the piston having means to allow air to flow past the piston when the piston slides axially away from the closed end and to prevent airflow past the piston as the piston moves towards the closed end, an elongate arm secured to said piston to extend out of the cylinder, the arm being displaceable to cause the piston to slide within the cylinder, and an adjustable airflow control means on the wall of the cylinder at a selected position to selectively vary a gap between at least one part of the periphery of the piston and the adjacent part of the cylinder wall to allow variation of flow of air between the piston and cylinder wall at said selected position, to cause, in use, a sudden reduction in the air pressure within the chamber, wherein the adjustable airflow means comprises means external of the cylinder wall causing at least part of the internal cylinder wall to bendably deflect away from the adjacent part of the piston periphery.

4,707,883

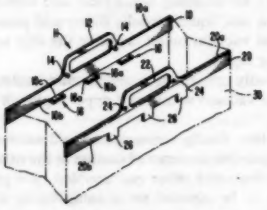
BAG HANDLE

Andrew A. Irani; Bernd H. Schulte-Ladbeck, and Aspee A. Arani, all of Houston, Tex., assignors to Polsun Manufacturing Corporation, Houston, Tex.

Continuation-in-part of Ser. No. 798,949, Nov. 18, 1985, and a continuation-in-part of Ser. No. 820,997, Jan. 22, 1986. This application Dec. 19, 1986, Ser. No. 943,810

Int. Cl.[4] B65D *33/06*

U.S. Cl. 16—110 R **20 Claims**



1. A bag handle comprising:

(a) opposing handle strips each having a line of attachment for a bag; and

(b) releasable interlocking means on said handle strips below said line of attachment for said bag, said releasable interlocking means comprising end sections and a crossbar extending from one of said handle strips to form a slot, and a tab forming element extending from a lower portion of the opposing handle strip, wherein said tab forming ele-

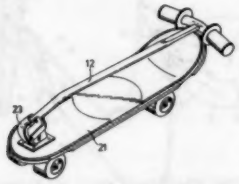
ment is insertable in said slot for securing said strips together.

4,707,884

FOLDABLE HANDLE FOR A SKATEBOARD

San T. Chang, 82, Lane 145, San Ho Rd., sec. 4, San Chang City, Taipei Hsien, Taiwan

Filed Jun. 6, 1986, Ser. No. 871,368
Int. Cl.[4] B25G 1/04
U.S. Cl. 16—113 8 Claims



1. A foldable handle for a skateboard comprising:

a base plate adapted to be fixed on a base board of a skateboard;

two opposed upright plates, fixed on said base plate and spaced apart from each other at a predetermined distance;

a handle, pivoted between said two upright plates, and which does not contact said base plate at a lower end portion of the handle;

a gripping mechanism, disposed between said two upright plates along a side of said handle, including a gripping element pivoted between said two upright plates, and a resilient member biasing said gripping element upwardly to grip said lower end portion of said handle; and

a block member, fixed between said two upright plates along an opposite side of said handle from said gripping mechanism so that, said block member, said two upright plates and said gripping mechanism surround closely and locate said lower end portion of said handle in position;

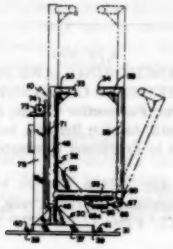
whereby, when said gripping element is moved downward against said resilient member to disconnect with said lower end portion of said handle, said handle is capable of being folded to rest on said base board of said skateboard.

4,707,885

HEAD HOLD DOWN FOR HIDE PULLER

Wilson H. Swilley, Persia, Iowa, assignor to The Cincinnati Butchers' Supply Company, Cincinnati, Ohio

Filed Dec. 19, 1986, Ser. No. 944,412
Int. Cl.[4] A22B 1/00, 5/16
U.S. Cl. 17—21 10 Claims



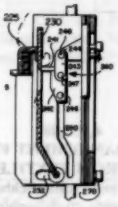
1. In combination with an overhead conveyer for supporting animal carcasses with their heads down and conveying same along work stations and an up hide puller adjacent said conveyer at an up hide pulling work station, means mounted on the floor for holding the lower end of the carcass at the head during an up hide pulling operation, said holding means comprising, a first bar extending substantially parallel to the direction of carcass travel and spaced above the floor at a level substantially at the neck of the carcass, a second bar coacting with said first bar to selectively engage a carcass neck and hold the head at the lower end of the carcass against upward movement, said second bar extending substantially parallel to said first bar and being movable between gripping and releasing positions, and means for actuating said movable bar.

4,707,886

POULTRY OIL SAC REMOVAL METHOD AND APPARATUS

Lacy Simmons, 101 Simmons Industrial Blvd., Dallas, Ga. 30132

Continuation-in-part of Ser. No. 761,424, Aug. 1, 1985, Pat. No. 4,619,017, which is a division of Ser. No. 284,087, Jul. 16, 1981, Pat. No. 4,532,676, and Ser. No. 517,811, Jul. 27, 1983, Pat. No. 4,550,473, each is a continuation-in-part of Ser. No. 873,370, Jan. 20, 1978, abandoned. This application Oct. 27, 1986, Ser. No. 923,400
Int. Cl.[4] A22C 21/00
U.S. Cl. 17—45 21 Claims



1. A method of removing an oil sac from a bird in a poultry processing operation, including the steps of:

engaging the bird in such a manner so as to identify the location of the bird's tail section containing the oil sac;

holding the bird's tail section against displacement;

applying pressure to the bird's tail section around the oil sac to cause the oil sac to protrude outwardly from the bird through an apertured plate; and

peeling the oil sac from the bird by a movable scraping means for engaging a portion of the oil sac protruding through the apertured plate and displacing the scraping means thereby effecting peeling of the oil sac from the bird.

4,707,887

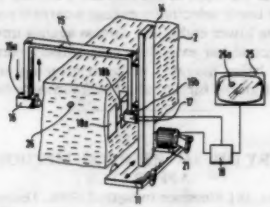
APPARATUS FOR DETECTING FOREIGN BODIES, SUCH AS PIECES OF METAL OR THE LIKE, IN TEXTILE FIBER BALES

Ferdinand Leifeld, Kempen, and Paul Teichmann, Monchen-Gladbach, both of Fed. Rep. of Germany, assignors to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany

Filed Oct. 3, 1985, Ser. No. 783,446
Claims priority, application Fed. Rep. of Germany, Oct. 5, 1984, 3436498
Int. Cl.[4] D06H 3/14; D01G 9/00
U.S. Cl. 19—0.2 18 Claims

1. In a bale opener arranged for a back-and-forth travel along a series of stationarily supported fiber bales, including a detaching means supported above the fiber bales for progressively removing fiber tufts from upper bale faces during travel ofthe bale opener; the improvement comprising search means for detecting foreign bodies in the fiber bales during operation of the bale opener; said search means being mounted on said bale opener for travel therewith; said search means being

situated upstream of the detaching means as viewed in the direction of movement of said bale opener and being oriented to scan the stationary fiber bale being worked on by the bale



opener for detecting foreign bodies at locations within the fiber bale prior to an arrival of said detaching means in said locations.

4,707,888

METHOD AND ARRANGEMENT FOR EXTRACTING FIBER FLOCKS FROM TEXTILE FIBER BALES

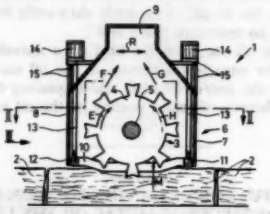
Rolf Binder, Schottikon, and Walter Schlepfer, Winterthur, both of Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland

Filed Mar. 11, 1986, Ser. No. 838,554

Claims priority, application Switzerland, Mar. 22, 1985, 01271/85

Int. Cl.[4] D01G *13/00, 7/06*

U.S. Cl. 19—80 R **5 Claims**



1. A method of extracting fiber flocks from textile fiber bales by an extraction member which extends between and beyond grid bars and penetrates into the surface layer of the respective fiber bale to extract the fiber flocks therefrom for transfer to a flock transport system, comprising the steps of varying the extent to which the extraction member extends beyond the grid bars in dependence on the density and/or the type of the fiber material of the surface layer; moving the extraction member in a plurality of passes over the respective fiber bale and extracting the fiber flocks from the surface layer thereof with a variable penetration depth during each pass dependent upon the bale height, wherein said penetration depths for different passes and said varying the extent to which the extraction member extends beyond the grid bars, are automatically variable, independently of each other in dependence on the density and/or the type of the fiber material of the surface layer.

4,707,889

ATTACHING DEVICE FOR BAG

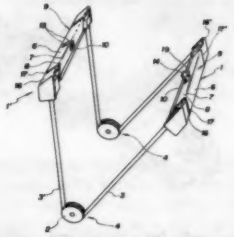
Hidejiro Sato, 8-1-102, Hanegi 1-Chome, Setagaya-Ku, Tokyo, Japan

Filed Aug. 5, 1986, Ser. No. 893,208

Claims priority, application Japan, Aug. 14, 1985, 60-124691[U]

Int. Cl.[4] B65D *77/00*

U.S. Cl. 24—30.5 R **2 Claims**



1. A device for gripping and holding the open end of a bag in a manner to alternately close the top of the bag and to then open up access to the interior of the bag, said device comprising two juxtaposed mouthpieces (1, 1') and pivot support means (2, 3, 4) to permit movement of said mouthpieces alternately toward and away from each other, the improvement comprising that each of said mouthpieces includes:

(a) an elongated base plate (12) that extends in a generally horizontal direction,

(1) the inner edge portions (10) of the base plates (12) of said mouthpieces each containing an elongated groove (11),

(b) stationary portions (5) extending upwardly from the outer portions of said elongated base plate (12),

(c) sloping portions (6) extending inwardly and upwardly from said stationary portions (5),

(d) pawl portions (8) connected along the uppermost edges of said sloping portions (6) by a thin connecting portion (7) that permit said pawl portions (8) to be folded or pivoted through a limited arc, the outer unconnected edge portion of said pawl portion constituting an engaging member (9) and being foldable downwardly to engage with said elongated groove (11) of said elongated base plate (12) and to clamp therebetween at least a portion of the open end of a bag, and

(e) cooperative engagement means (14, 15) on said mouthpieces which will permit said mouth pieces (1, 1') to be alternately locked together in an abutting relationship or spread apart.

4,707,890

FRUSTOCONIC ANCHORING JAWS FOR CABLES AND THEIR METHODS OF MANUFACTURE

Jose Savall, Chartres; Parmentier Claude, Parmentier; Claude, and Amelot Bernard, Amelot; Bernard, both of Epernon, all of France, assignors to Freyssinet International (STUP), Coignieres, France

Filed Aug. 5, 1986, Ser. No. 893,282

Claims priority, application France, Aug. 12, 1985, 85 12290

Int. Cl.[4] F16G *11/00*; **B23P** *17/00*

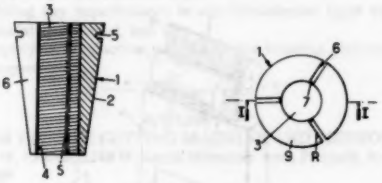
U.S. Cl. 24—122.6 **5 Claims**

1. Blank for a split frustoconic jaw, said blank constituted by a part bounded externally by a frustoconic surface and hollowed by a cylindrical axial channel with a striated inner surface, said part including keys formed radially outwardly of said cylindrical axial channel by substantially radial slashes and a linking bridge of small thickness subsisting at a radially inner end of each of said radial slashes and along the central channel.

4. Method of manufacturing a split frustoconic jaw intended for anchoring a cable comprising the following steps:

(a) sawing substantially axially and radially extending slashes in an original part to form a blank;

(b) allowing bridges of small thicknesses to subsist at a radially inner end of the slashes along a central channel in said blank;



(c) holding keys of the blank together by said bridges;

(d) hardening the surface of the keys whilst making the bridges fragile; and

(e) breaking the bridges into small fragments to form the split frustoconic jaw.

4,707,891

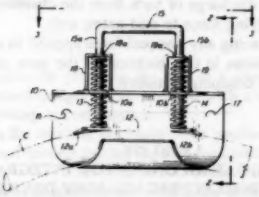
CABLE CLAMP

Douglas A. Chidester, R.D. 2, Box 730, Greene, N.Y. 13778

Filed Nov. 18, 1986, Ser. No. 931,807

Int. Cl.⁴ F16G *11/00*; B65H *75/28*

U.S. Cl. 24—136 R **11 Claims**



1. A cable clamp assembly for releasably clamping a cable end to the inside of a flange of a cable reel, comprising, in combination: a tubular member having a slot extending the length of said tubular member; a clamp member situated within said tubular member; resilient means extending within said tubular member and tending to urge said clamp member toward a first wall portion of said tubular member; and handle means attached to said clamp member and extending through a second wall portion of said tubular member to allow said clamp member to be pulled in a direction opposite to the direction in which said clamp member is urged by said resilient means.

4,707,892

FISH ROD TRANSPORT CLAMP

Donald C. Nelson, 1317 N. 8th St., Tacoma, Wash. 98403

Filed Apr. 2, 1984, Ser. No. 596,239

Int. Cl.⁴ A44B *21/00*; A01K *87/02*

U.S. Cl. 24—336 **5 Claims**

1. A fish rod clamping device for the clamping of the disconnectable sections of a fishing rod in parallel alignment comprising:

a pliable semi-circular jaw;

an opposing pliable semi-circular jaw;

a means of attaching the semi-circular jaws to each other;

a second semi-circular jaw;

a pliable semi-circular jaw positioned in opposition to the second semi-circular jaw;

a means of attaching the second set of semi-circular jaws to each other; and

a means of securing the two sets of jaws to each other.

4,707,893

FABRIC FASTENER

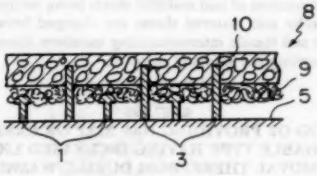
Masatora Hashizume, Ikeda; Eiichi Kudoh, Osaka; Setuzo Fujiwara, Daito, and Hitomi Shiomi, Osaka, all of Japan, assignors to Kanebo Bell-Touch, Ltd., Osaks, Japan

Filed May 2, 1986, Ser. No. 858,963

Claims priority, application Japan, May 8, 1985, 60-98445

Int. Cl.⁴ A44B *13/00*

U.S. Cl. 24—446 **8 Claims**



1. A fabric fastener comprising only male members suitable for fastening a working element having a rough surface formed of a porous material, characterized in that the male members include at least two groups of projections from one surface thereof, a first group having rearwardly facing outer end portions and a second group being of a straight needle shape and taller than the projection of the first group, with the projections of the first group comprising means, when engaged with a working element, for at least partial engagement into a surface of the working element, and with said projections in the second group comprising means when engaged with a working element, for substantial penetration of the interior of the working element, with said projections in said first group and said second group comprising means facilitating peeling resistance and shear resistance, respectively, upon application of outside forces to the fastener.

4,707,894

FASTENING SYSTEM FOR INTERCONNECTING SHEETS OF PLASTIC MATERIALS INCLUDING GLASS

David Friedwald, Cherry Hill, N.J., assignor to Polycast Technology Corporation, Stamford, Conn.

Filed Jan. 14, 1987, Ser. No. 3,137

Int. Cl.⁴ A44B *21/00*

U.S. Cl. 24—459 **4 Claims**

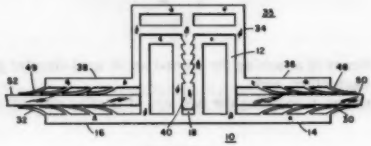
1. A fastening system for interconnecting sheets of material such as plastics and glass comprising:

an elongated longitudinal female member having an upstanding longitudinal rectangular base with transverse legs extending from opposite sides thereof,

a central longitudinal socket in said base having an open top with a downwardly extending prong receptacle therein formed by upstanding side walls extending longitudinally the entire length of said base and having enclosed longitudinal openings the length of said base on both sides of said socket,

a male interconnecting member having an upstanding rectangular longitudinal housing with transverse support members extending from opposite sides of said housing,

a downwardly extending bayonet prong centrally located in and integral with said housing extending longitudinally the length of said housing,



said female member adapted to have material sheets to be interconnected positioned along a lower longitudinal dimension on said legs abutting opposite sides of said upstanding rectangular base,

said male member adapted to have said downwardly extending bayonet prong inserted in said prong receptacle in said female member thereby rectangularly closing said socket in said female member and bringing the support members of said male member into contact with an upper longitudinal dimension of said material sheets being interconnected whereby said material sheets are clamped between said male and female interconnecting members thereby interconnecting the sheets of material.

4,707,895

METHOD OF PROVIDING NAP MAP OR CARPET OF WASHABLE TYPE HAVING INCREASED LIQUID REMOVAL THEREFROM DURING WASHING THEREOF

Aage Lang, Kolind, Denmark, assignor to Clean-Tex A/S, Morke, Denmark

Continuation of Ser. No. 697,687, Feb. 4, 1985, abandoned, which is a continuation of Ser. No. 540,274, Oct. 11, 1983, abandoned, which is a division of Ser. No. 373,688, Apr. 30, 1982, Pat. No. 4,439,475. This application Feb. 12, 1987, Ser. No. 15,541

Claims priority, application Denmark, May 26, 1981, 2287/81

Int. Cl.[4] B32B *3/02*

U.S. Cl. 28—107 **6 Claims**

1. Method of providing an energy saving floor covering such as a nap mat of the washable type having a plurality of fibers on the face side thereof and a rubber-like backing material on the back side thereof comprising the steps of: providing a nap mat with a rubber-like backing material and forming a plurality of perforations in the rubber-like backing material which are liquid permeable during subjecting the mat to a pressure differential between the face and back of the mat but which are otherwise impermeable to liquid.

4,707,896

CRIMPER DISCHARGE REGULATION

Lyles H. Sowell, Old Hickory, Tenn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

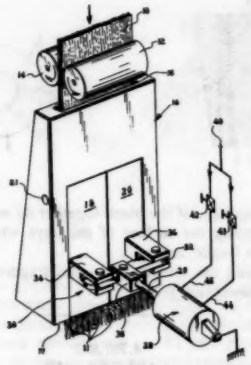
Filed Nov. 5, 1986, Ser. No. 927,593

Int. Cl.[4] D02G *1/12*

U.S. Cl. 28—250 **9 Claims**

1. In a stuffer box crimping process in which yarn is forced into a crimping chamber and the outlet of the chamber is provided with a single hinged gate having force applied thereto by fluid pressure means, the improvement of which comprises: dividing said single gate into a plurality of hinged gates positioned side-by-side across the width of said outlet and balancing any unequal force applied to said gates due to variations in thickness of yarn exiting said outlet by transferring force among gates by means of a linkage connected between said gates and said fluid pressure means.

4. A yarn crimping apparatus comprising a crimping chamber having an inlet and an outlet;



means located adjacent the inlet of the crimping chamber for forcing yarn into the chamber;

a plurality of hinged gates in a side-by-side relationship associated with the outlet of the crimping chamber to regulate the discharge of yarn from the chamber;

means for applying force to said gates; and

means for balancing any unequal force applied to said gates due to variations in the thickness of the yarn exiting the outlet of the crimping chamber.

4,707,897

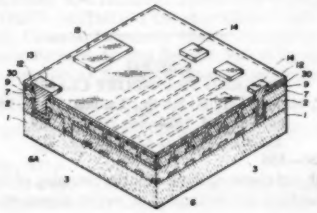
MONOLITHIC SEMICONDUCTOR INTEGRATED CIRCUIT FERROELECTRIC MEMORY DEVICE, AND METHODS OF FABRICATING AND UTILIZING SAME

George A. Rohrer, Benton Harbor, Mich., and Larry McMillan, Longmont, Colo., assignors to Ramtron Corporation, Colorado Springs, Colo.

Continuation-in-part of Ser. No. 658,199, Feb. 17, 1976, Pat. No. 4,195,355, which is a continuation-in-part of Ser. No. 316,417, Dec. 18, 1972, Pat. No. 3,939,292, which is a continuation-in-part of Ser. No. 76,059, Sep. 28, 1970, Pat. No. 3,728,694. This application Mar. 24, 1980, Ser. No. 133,338

Int. Cl.[4] H01G *07/00*

U.S. Cl. 29—25.42 **26 Claims**



1. A method of fabricating a monolithic semiconductor integrated circuit and ferroelectric memory device comprising:

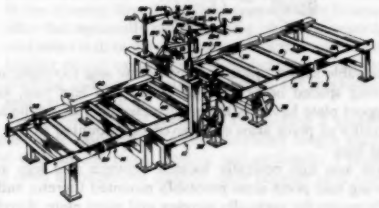
A. forming a first layer interconnects on the surface of a semiconductor integrated circuit;
B. depositing a non-semiconductor dielectric and cutting interconnect and bonding pad vias therein;
C. depositing a conductive layer and forming a bottom electrode;
D. depositing a second non-semiconductor dielectric and forming vias therein;
E. applying a ferroelectric layer;
F. filling any imperfections in said ferroelectric layer with insulative material; and
G. applying conductive material to the bonding and interconnect pads.

4,707,898

BEAM PROFILE CUTTING MACHINE AND METHOD

Clyde W. Creech, 2243 W. South Mountain Ave., Phoenix, Ariz. 85009

Filed May 12, 1986, Ser. No. 861,827
Int. Cl.[4] B23P *17/00*; B23K *7/00*
U.S. Cl. 29—155 R **22 Claims**



1. Apparatus for profiling the end of a structural H-beam having opposed flanges interconnected with a web, said apparatus comprising in combination:
(a) means for locating the beam to be profiled;
(b) first and second cutting torches for cutting the opposed flanges;
(c) a third cutting torch for cutting the web;
(d) means for supporting each of said first and second cutting torches;
(e) means for rectilinearly translating said first and said second cutting torches across the respective one of the opposed flanges to profile the edges of the flanges;
(f) means for setting the angle of cut of each of said first and second cutting torches in any of three planes;
(g) means for translating said third cutting torch across the web to profile the edge of the web;
(h) means for guiding said third cutting torch on a predetermined path along the web during operation of said translating means; and
(i) means for controlling the operation of said first, second and third cutting torches.

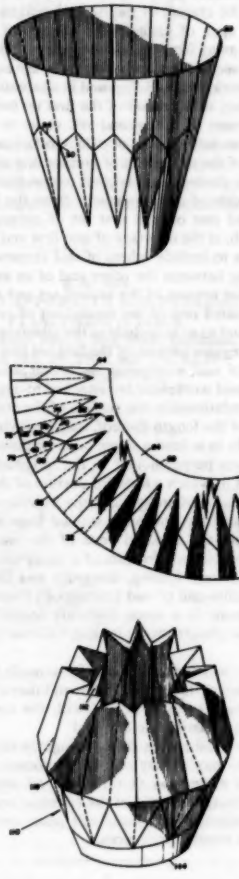
16. A method for profiling the end of a structural H-beam having opposed flanges interconnected with a web, said method comprising the steps of:
(a) locating the beam to be profiled;
(b) cutting the opposed flanges with first and second cutting torches to profile the edges of the flanges;
(c) cutting the web with a third cutting torch to profile the edge of the web;
(d) supporting the first and second cutting torches;
(e) rectilinearly translating the first and second cutting torches across the respective ones of the opposed flanges to cut the respective ones of the opposed flanges;
(f) setting the angle of cut of each of the first and second cutting torches in any of three planes;
(g) translating the third cutting torch across the web to cut the web;
(h) guiding the third cutting torch on a predetermined path along the web during operation of said translating step; and
(i) controlling the operation of the first, second and third cutting torches.

4,707,899

METHOD OF MAKING ROCKET MOTOR EXTENDIBLE NOZZLE EXIT CONE

Victor Singer, Newark, Del., assignor to Morton Thiokol, Inc., Chicago, Ill.

Filed Aug. 21, 1985, Ser. No. 768,089
Int. Cl.[4] B23P *15/00*; B21D *53/92*; B64C *15/06*
U.S. Cl. 29—157 C **10 Claims**



1. The method of making an extendible nozzle exit cone for attachment to the exit end of a rocket motor nozzle with a portion at least of said extendible nozzle exit cone being initially folded inwardly thereof for compact stowage relative to the rocket motor nozzle and adapted to be unfolded upon firing of the rocket motor due to forward-to-aft flow of rocket motor gas therethrough for substantially increasing the ratio of

the effective rocket motor nozzle/extendible nozzle exit cone exit plane area to the rocket motor nozzle throat area, said method comprising:

(a) cutting a workpiece of thin sheet heat-resistant ductile material into plan view arcuate form having first and second transverse regions between inner and outer arcuate sides, the outer arcuate side being longer than the inner arcuate side, and including opposed ends that may be brought into edge-to-edge relationship to form a frustum of a cone the smaller radius end of which is suitable for attachment to the exit end of a rocket motor nozzle and the larger radius end of which is of such size as to provide the desired increase in area ratio;

(b) deforming said arcuate workpiece adjacent the longer arcuate side from one end of the arcuate workpiece to the other so as to include in said first arcuate region of said workpiece a plurality of spaced creases running transversely thereof in first and second sets with the apex of each of the creases of the first set pointing at the viewer and the apex of each of the creases of the second set pointing away from the viewer, some of the creases of said first and second sets being normal to the outer arcuate side of said workpiece and disposed in alternating relation with each other, such creases of the first set being shorter than such creases of the second set, so as to include in said second arcuate region of said workpiece others of the creases of the second set of creases that uniformly extend part way through said second region toward the shorter arcuate side of said workpiece from the inner end of an associated one of said first set of creases, in alignment therewith, at the interface of said first and second regions, and so as to include others of said creases of said first set extending between the other end of an associated one of such other creases of the second set and the inner end of an associated one of the second set of creases first mentioned, and so as to include at the interface of said first and second regions creases of the first set that extend longitudinally of said workpiece, such that when the opposed ends of said workpiece are attached to each other in edge-to-edge relationship, the surface of the cone, for a portion at least of the length thereof, may be folded inwardly and forwardly in at least a single layer of fluted form between two planes perpendicular to the longitudinal axis of the cone and in which a forward portion of the cone is extensively folded whereby the cone may be stowed in a reduced envelope and in the stowed form is quite rigid;

(c) attaching the opposed ends of the arcuate workpiece together to form a frustum of a cone; and

(d) progressively folding, inwardly and forwardly of the larger radius end of said frustum of a cone, the aft surface of said cone in a single inwardly folded layer of fluted form, and progressively folding a forward portion of said cone;

whereby said frustum of a cone so made is adapted to be attached at the smaller radius end thereof to the exit end of a rocket motor nozzle with the cone in a stowed position relative thereto; and

whereby upon rocket motor firing, the stowed frustum of a cone may deploy due to the forward-to-aft flow of rocket motor gas therethrough to provide a substantially increased ratio of the effective rocket motor nozzle/extendible exit cone exit plane area to the rocket motor nozzle throat area.

4,707,900

CYLINDER LINER SLEEVE PULLER

Rodney L. Twogood, Alliance; Raymond L. Wright, Hemingford, and Roger D. Rawle, Alliance, all of Nebr., assignors to Burlington Northern Railroad Co., Denver, Colo.

Filed Oct. 9, 1986, Ser. No. 916,830

Int. Cl.[4] B23P *19/04*

U.S. Cl. 29—244 **5 Claims**

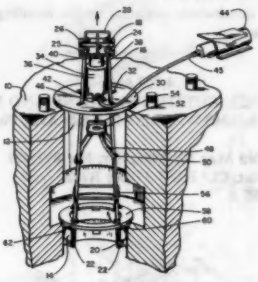
1. A cylinder liner sleeve puller driven by a hydraulic jack having an extended and a retracted position, said sleeve puller comprising:

a plurality of legs each having a top portion and a bottom portion;

outwardly facing flanged feet on the bottom portion of said legs for engaging said cylinder liner sleeve;

a top plate;

fastening means for removably fastening the top portions of said legs to said top plate;



a removable support plate located below said top plate and having spaced holes through which said legs pass, said support plate having a larger diameter than said cylinder;

a plurality of pivot arms each pivotably mounted to one of said legs;

a pivot arm hub centrally located between said legs and having said pivot arms pivotably mounted thereto; and

handle means for vertically moving said pivot plate, thereby moving said legs inwardly and outwardly.

4,707,901

PROCESS AND APPARATUS FOR MAKING COUPLED SLIDE FASTENERS

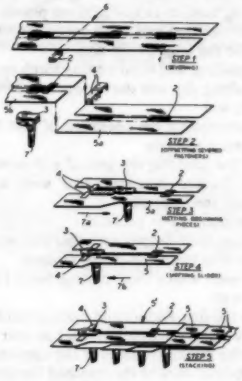
Alfons Fröhlich, Essen, Fed. Rep. of Germany, assignor to Opti Patent-, Forschnungs-und Fabrikations-AG, Riedern-Allmeind, Switzerland

Filed Jul. 14, 1986, Ser. No. 885,074

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1985, 3525133

Int. Cl.[4] B21D *53/50;* **B21F** *45/18;* **B29D** *5/00;* **A41H** *37/06*

U.S. Cl. 29—408 **6 Claims**



1. In a process for making a plurality of coupled slide fasten-

ers of a predetermined length each provided with an end piece, a slider and optionally a beginning piece from a continuous coupled slide fastener strip, comprising moving said coupled slide fastener strip stepwise cyclically in increments of said length of said coupled zipper, mounting said end piece and optionally said beginning piece in a pause between increments of movements, drawing said slider on said coupled slide fastener and separating the individual ones of said coupled slide fasteners by cutting, wherein:

said coupled slide fastener strip is gripped by at least one clamping member adjacent a location at which said cut is to be made in said coupled slide fastener strip on one side at the beginning of a leading one of said coupled slide fasteners and on the other side at the end of a trailing one of said coupled slide fasteners and then cutting said coupled slide fastener strip, the improvement wherein:

during each pause, first said cut is made, then subsequently said end piece is applied to a position for said end piece at the end of said trailing one of said coupled slide fasteners with the help of one of said clamping members and substantially simultaneously said leading one of said coupled slide fasteners separated from said coupled slide fastener strip is moved with said one or another of said clamping members from a cutting position into a slider drawing position, in the slider drawing position said slider is drawn in the opening direction of said coupled slide fastener and after that optionally said beginning piece is mounted, then said slider is drawn in the closing direction and finally said leading one of said coupled slide fasteners is released for stacking and said clamping members are repositioned in said cutting position.

6. An automatic final assembler for making a plurality of coupled slide fasteners of a predetermined length each provided with an end piece, a slider and optionally a beginning piece from a continuous coupled slide fastener strip comprising:

an end piece mounting unit with a feed mechanism, an end piece securing mechanism, a separating mechanism with a cutting knife and a first clamping member for a trailing one of said plurality of coupled zippers,

a beginning piece mounting unit with a beginning-piece-securing-mechanism and a second clamping member as well as a slider drawing mechanism,

said end piece mounting unit and said beginning piece mounting unit being positioned following each other in a cutting position in the feed direction of said coupled slide fastener strip and beside each other with said first and second clamping members and said slide fastener drawing mechanism being mounted spaced beside or below said end piece mounting unit, said beginning piece mounting unit being movable between a cutting position and a slider drawing position adjacent or in front of said slider drawing mechanism.

4,707,902

MECHANISM FOR ACCURATE REGISTER ALIGNMENT OF A BLANKET ON A BLANKET OR PLATE CYLINDER

Fred Kunkel, Offenbach, and Herbert Rebel, Rodgau, both of Fed. Rep. of Germany, assignors to M.A.N.-Roland Druckmaschinen Aktiengesellschaft, Fed. Rep. of Germany

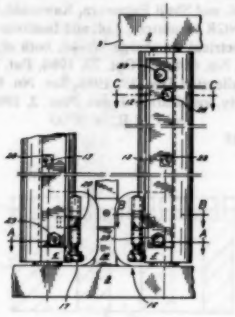
Filed Dec. 17, 1986, Ser. No. 943,251

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1985, 3545172

Int. Cl.[4] B23Q *16/00*

U.S. Cl. 29—417 **3 Claims**

1. A mechanism for the accurate register alignment of a blanket on a cylinder for selected-area, in-line varnishing in a rotary press comprising, tensioning spindles provided in an axis-parallel well in the plate cylinder and having clamping devices for the ends of said blanket, said spindles being rotatable independently of one another in order to tangentially pull the blanket over the cylinder surface by means of an adjustment mechanism, each clamping device is provided with registration means comprising at least two axially spaced radially directed register pins which are situated beneath the outer surface of the cylinder and which cooperate in exact register with two recesses provided in the associated blanket ends, said clamping device for the front blanket end being adapted to be fixed in a zero position by alignment of first marking means on



the blanket proximate the front end of the blanket and associated second marking means on said cylinder, and adjustment means associated with each of said clamping devices for axially displacing said clamping devices and said rotatable tensioning spindles in said cylinder.

4,707,903

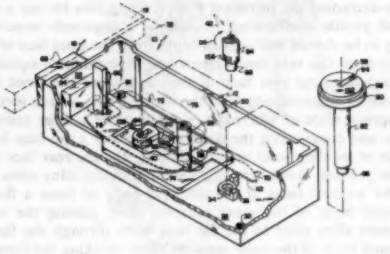
METHOD AND APPARATUS FOR PULLING A NOSE PLUG FROM A LOCK

Charles L. McCartney, Rte. 1, Box 898B, Ingleside, Tex. 78362

Filed Jan. 29, 1987, Ser. No. 8,589

Int. Cl.[4] B23P *19/02*

U.S. Cl. 29—426.5 **10 Claims**



1. A method of pulling a nose plug of a lock of the type including a cover having a sleeve extending therefrom and providing a passage therein, a nose plug rotatably received in the passage and having a key slot therein, a cam for operating the lock and unlocking the same, a shaft rigid with the nose plug and means comprising a press fit removably attaching the shaft and the cam, the method comprising the steps of

inserting a transverse end of a T-shaped element through the key slot;

rotating the T-shaped element to positon the transverse end out of registry with the key slot;

inserting a pull shaft into the key slot and into force transmitting engagement with the T-shaped element;

placing the T-shaped element in force transmitting engagement with the nose plug; and

imparting an axial force to the pull shaft in a direction away

from the lock and pulling the nose plug shaft out of press fit connection with the cam.

4,707,904

METHOD OF MANUFACTURING A DIE FOR EXTRUDING HONEYCOMB BODY

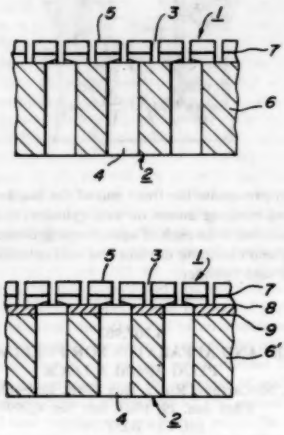
Sei Ozaki, Aichi, and Shoji Futamura, Kawasaki, both of Japan, assignors to NGK Insulators, Ltd. and Institute of Technology Precision Electrical Discharge Works, both of, Japan

Division of Ser. No. 664,003, Oct. 23, 1984, Pat. No. 4,653,996. This application Dec. 19, 1986, Ser. No. 943,796

Claims priority, application Japan, Nov. 2, 1983, 58-206560

Int. Cl.[4] B23P *9/00*

U.S. Cl. 29—445 2 Claims



1. A method of manufacturing a honeycomb structural body-extruding die provided with forming slits having a sectional profile conforming to that of honeycomb structural body to be shaped and a given depth from the front face of the die toward the rear face thereof and a plurality of openings formed from the rear face of the die toward the front face thereof to communicate with the forming slits, which method comprises steps of working a plate made of a wear resistant alloy and constituting the die front face and a die base body made of an alloy steel and constituting the die rear face into given profiles; flame-spraying a wear resistant alloy onto one of the worked faces of the die base body to form a flame-sprayed layer of the wear resistant alloy, joining the wear resistant alloy plate to the die base body through the flame-sprayed layer of the wear resistant alloy; working the forming slits in the wear resistant alloy plate; and boring the openings in the die base body.

2. A method of manufacturing a honeycomb structural body-extruding die provided with forming slits having a sectional profile conforming to that of honeycomb structural body to be shaped and a given depth from the front face of the die toward the rear face thereof and a plurality of openings formed from the rear face of the die toward the front face thereof to communicate with the forming slits, which method comprises steps of working a plate made of a wear resistant alloy plate constituting the front face of the die, a die base body made of an alloy steel and constituting the rear face of the die, and an alloy steel plate to be interposed between the wear resistant alloy plate and the die base body into given profiles; flame-spraying on a face of the alloy steel plate a metal having substantially the same properties as those of the wear resistant alloy plate to form a flame-sprayed layer of the wear resistant alloy; grinding the plane of the wear resistant alloy flame sprayed layer up to a given thickness and joining the wear resistant alloy plate to the wear resistant alloy flame-sprayed layer on the alloy steel plate; joining the other face of the alloy steel plate opposite to the one face, which the wear resistant alloy plate is joined, to the die base body; working the forming slits from the wear resistant alloy plate toward the alloy steel plate; and boring the openings from the die base body toward the alloy plate.

4,707,905

METHOD FOR ESTABLISHING A CONNECTION BETWEEN A TUBE END PLATE AND A HEADER BOX

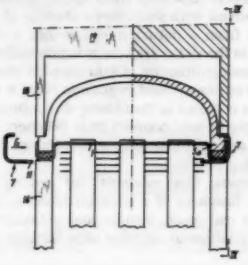
Patrice Clair, Courbevoie, France, assignor to Societe Anonyme des Usines Chausson, Ansieres, France

Division of Ser. No. 632,640, Jul. 20, 1984, abandoned. This application Oct. 2, 1986, Ser. No. 915,886

Claims priority, application France, Aug. 4, 1983, 83 12857

Int. Cl.[4] B23P *11/02*

U.S. Cl. 29—446 5 Claims



1. A method for establishing a connection between a tube end plate and a header box of a heat exchanger in which said connection is provided by a clamp bearing underneath a peripheral groove of the tube end plate and above a peripheral bearing flange of a header box covering said tube end plate and pressing a gasket against said tube end plate, comprising the steps of shaping a clamp having upper and lower spaced bearing portions regularly separated lengthwise exerting a compression effort at spaced locations between the tube end plate and the header box in order to deform said gasket, and while said compression is maintained positioning the clamp by a sliding motion between said spaced locations so as to come to bear on one hand on substantially the entire surface of the bearing flange between said spaced compression locations of the header box and on another hand against substantially the entire surface of the bottom of the peripheral groove between said spaced compression locations of the tube end plate.

4,707,906

METHOD OF ATTACHING TUBE TO A TUBE HOLDER

John T. Posey, 1739 Meadowbrook Rd., Altadena, Calif. 91001

Continuation of Ser. No. 843,873, Mar. 25, 1986, abandoned, which is a continuation of Ser. No. 753,802, Jul. 3, 1985, abandoned, which is a continuation of Ser. No. 425,322, Sep. 28, 1982, abandoned. This application Sep. 10, 1986, Ser. No. 906,675

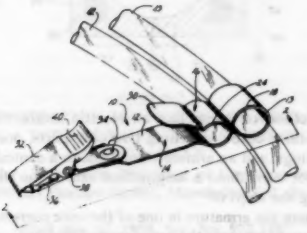
Int. Cl.[4] B23P *11/02*

U.S. Cl. 29—453 6 Claims

1. A method for handling hospital tubing attached to a fixture used in a hospital, by selectively fixedly or slidably retaining the hospital tubing in a tube holder and affixed to the hospital fixture, the method comprising:

providing a tube holder in the form of an elongated support strip with a generally U-shaped reverse bend at one end forming opposite first and second legs on a tube-holding portion of the support strip, the tube holder having a pair

of side-by-side resilient cylindrical receptacles formed by the first and second legs of the tube holder, each receptacle having an access opening expandable by flexure of the first and second legs for admitting the hospital tubing sideways into a selected one of the receptacles, each access opening being smaller than the diameter of the hospital tubing, one of the receptacles having a smaller diameter than the hospital tubing to fix the tubing to the holder by the applied tension of the first and second legs of the tube holder, the other of the receptacles having a slightly larger diameter than the same hospital tubing for slidably retaining the same tubing in the tube holder, the larger diameter receptacle being bounded by the reverse bend at the end of the tube holder so that the larger diameter receptacle slidably retains the hospital tubing while the reverse bend and the access opening to the larger diameter receptacle prevent sideways migration of the tubing in the larger receptacle, the tube holder further including a clip



at an end opposite from the tube-holding portion of the tube holder for releasably attaching the tube holder to the hospital fixture;

releasably attaching the clip to the hospital fixture; and

flexing the legs of the tube holder and inserting the hospital tubing selectively in the smaller diameter receptacle to selectively fixedly retain the hospital tubing in the smaller diameter receptacle with the tension of the tube holder preventing longitudinal travel of the hospital tubing relative to the tube holder, or flexing the legs of the tube holder and moving the tubing farther into the tube holder by inserting the same hospital tubing into the larger diameter receptacle to selectively slidably retain the hospital tubing in the larger diameter receptacle at the end of the tube holder so the larger diameter receptacle normally resists sideways travel of the hospital tubing in the tube holder while permitting guided longitudinal travel of the hospital tubing relative to the tube holder.

4,707,907

METHOD FOR SCANNING FITTING OF TWO PIECES, ONE GOING INTO THE OTHER

Rossen V. Ivanov, Sofia, Bulgaria, assignor to Institut PO Technitcheska Kibernetike I Robotika, Sofia, Bulgaria

Filed Apr. 28, 1986, Ser. No. 856,714

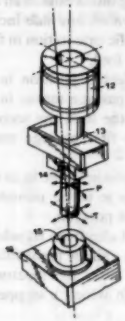
Claims priority, application Bulgaria, Apr. 26, 1985, 69966

Int. Cl.[4] B23P *19/02*

U.S. Cl. 29—525 **1 Claim**

1. Method of scanning fitting of two pieces, one going into the other, wherein one of said pieces is a handled piece and has a central axis extending from a front end to a back end and is handled by a machine at its back end and the other of said pieces is stationary, said method comprising the steps of

first imparting the handled piece with a seeking vibration motion and an axial joining motion, said seeking vibration motion comprising two components, namely a seeking linear oscillatory component which is substantially parallel with the axial joining motion and a seeking rotation oscillatory component, which two components are continuously and consecutively alternating within time, such that the handled piece vibrates translationally in one plane and rotationally around the center of its front end in a second plane, and the two planes make an angle between each other and rotate around an initial position of the axis of the handled piece continuously and synchronized, and



then from the time of an initial entry of one of the pieces into the other up to the time of their final joining, the handled piece, parallelly with its axial motion, making only said rotational oscillatory motion about said second plane, which second plane continues to rotate in a similar way.

4,707,908

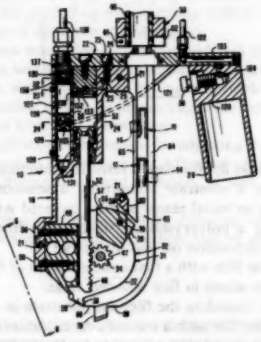
METHOD AND TOOL FOR INSERTING A CLIP

Paul R. Everhard, 252 Southpoint Dr., and Roy K. Monroe, 100 Loch Lomond Dr., both of Lexington, Ky. 40503

Filed May 12, 1986, Ser. No. 862,038

Int. Cl.[4] B23P *19/00, 19/04, 19/08*

U.S. Cl. 29—526 R **20 Claims**



1. A tool for inserting a clip having a crown on one side into a hole in a portion of an element in a single plane so that portions of an inserted clip engage opposite sides of the portion of the element at a predetermined position including:

support means having disposition means for disposition in a hole in an element in which a clip is to be inserted;

said support means having first passage means to receive a clip in a specific orientation;

said disposition means having second passage means cooperating with said first passage means to receive a portion of a clip received in said first passage means;

stopping means to stop a clip received in said first passage means in a specific orientation at a selected position in said first passage means and said second passage means;

and advancing means for advancing a stopped clip from its selected position in said first passage means and said second passage means into a hole in which said disposition means is disposed after said stopping means has stopped a clip.

19. A method of inserting into a hole in an element in a single plane a clip having a crown on one side including:

orienting a clip in a specific orientation in first passage means in support means of a tool;

stopping a clip at a selected position in the first passage means and in second passage means in locator means of the support means of the tool, the second passage means cooperating with the first passage means to receive a portion of a clip;

disposing the locator means in a hole in an element in a single plane in which a clip is to be mounted after a clip is stopped at the selected position;

and advancing a stopped clip from its selected position into a hole in an element in a single plane into which a stopped clip is to be inserted after the locator means has been disposed in the hold in which a stopped clip is to be inserted.

4,707,909

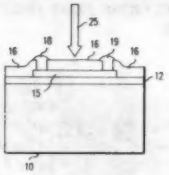
MANUFACTURE OF TRIMMABLE HIGH VALUE POLYCRYSTALLINE SILICON RESISTORS

Richard A. Blanchard, Los Altos, Calif., assignor to Siliconix Incorporated, Santa Clara, Calif.

Filed Aug. 8, 1986, Ser. No. 894,418

Int. Cl.[4] H01L *21/477, 27/00, 31/00*

U.S. Cl. 437—109 **13 Claims**



3. A process for forming a resistor, including the steps of:

providing a substrate comprising a semiconductor wafer having an initial planar surface covered with dielectric:

providing a polycrystalline silicon thin film by chemical vapor deposition on said dielectric:

doping the film with a first concentration of first conductivity type atoms in first selected areas:

first time annealing the film and substrate in a furnace:

doping the film with a second concentration of second conductivity type atoms in second selected areas:

second time annealing the film and substrate in a furnace at a temperature selected to cause a limited increase in the second selected area resistance value:

connecting the second selected area to an external resistance measuring device: and

monitoring the second selected area resistance value while using a focused heat source to locally anneal the second selected area until the second selected area resistance has increased to a specified value.

7. A process as in claim 3 wherein the step of second time annealing is followed by the step of covering the thin film with passivation, and wherein the step of connecting the thin film to an external device includes the step of providing conductive leads with contacts through the passivation to each second selected resistor area of the thin film.

4,707,910

METHOD OF ASSEMBLING ELECTRIC MOTORS

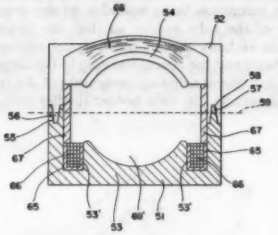
Abdul Saeed, Hunstetten, Fed. Rep. of Germany, assignor to Black & Decker Inc., Newark, Del.

Continuation of Ser. No. 701,931, Feb. 15, 1985, abandoned. This application Jun. 5, 1986, Ser. No. 871,150

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1984, 3406906

Int. Cl.[4] H02K *15/02*

U.S. Cl. 29—596 **7 Claims**



1. A method of assembling an electric motor, the motor having a stator core comprising two core parts, one or more field windings, and an armature rotatable in a central opening in the stator core about a longitudinal axis of the stator core, comprising the steps of:

positioning the armature in one of the core parts by relative movement between the armature and said one core part in a direction transverse to said longitudinal axis;

then assembling the other core part to said one core part by relative movement therebetween in said direction;

assembling at least one field winding on said one core part before assembling said other core part to said one core part, said at least one field winding and said one core part being assembled by relative movement therebetween in said direction;

placing a spacer between the two core parts before the two core parts are assembled together; and

assembling a second field winding on said other core part before assembling said core parts together, and engaging said spacer between said field windings to space the latter apart when the two core parts are assembled together.

4,707,911

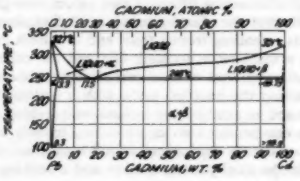
POROUS ELECTRODES AND METHOD OF MAKING SAME

Frederick P. Kober, New York, N.Y., and Oscar V. Montefusco, Stillwater, Pa., assignors to PolyCrystal Technologies Corp., New York, N.Y.

Division of Ser. No. 760,673, Jul. 30, 1985, abandoned. This application Jan. 14, 1987, Ser. No. 3,090

Int. Cl.[4] H01M *4/18*

U.S. Cl. 29—623.5 **26 Claims**



1. A method for forming a porous, self-supporting, structur-

ally integral and electrically continous electrode, which method comprises:

(a) forming a molten mixture of an electrically conductive metal and a pore forming component wherein said pore forming component is distributed as discrete particulate matter throughout said molten mixture;

(b) cooling and forming said molten mixture into a solid electode structure having predetermined dimensions and configuration, with said pore forming component being distributed throughout the resultant solid metallic electrode;

(c) removing said particulate pore forming component from said solid electrode thereby forming the porous electrode structure, with each pore being defined by walls of said metal, and

(d) subjecting said porous electrode structure to an oxidizing environment to form a layer of an electrochemically active material in situ on the walls of said metal within said pores.

4,707,912

CRASH PROTECTION APPARATUS FOR A DEVICE FOR PULLING A TUBE OUT OF A TUBE SHEET OF A HEAT EXCHANGER

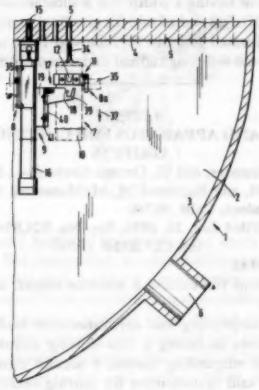
Hans Haller, Mannheim, Fed. Rep. of Germany, assignor to Brown Boveri Reaktor GmbH, Mannheim, Fed. Rep. of Germany

Filed Jun. 12, 1986, Ser. No. 873,370

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1985, 3521355

Int. Cl.[4] B23P *15/26*

U.S. Cl. 29—726 **5 Claims**



1. Crash protection apparatus for a pulling device having a first hollow-piston cylinder and a pulling claw for pulling a tube out of a tube sheet of a heat exchanger chamber in which the pulling device is disposed, the crash protection apparatus comprising a second cylinder without a piston rod having an axis substantially parallel to the axis of the first hollow-piston cylinder and being fixed relative to the tube sheet in the chamber, a piston of said second cylinder, a bracket extending from said piston substantially at a right angle to the axis of said second cylinder for supporting the pulling device with a supporting force provided by said other cylinder, and means for controlling the supporting force for compensating only the weight of the pulling device in each position of the pulling device.

4,707,913

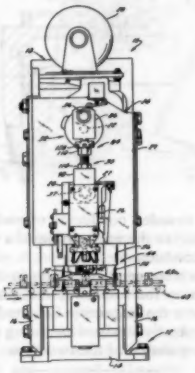
TERMINAL APPLICATOR HAVING QUICK-ADJUST CONNECTING LINK

Edward F. Moline, Mukwonago, Wis., assignor to Artos Engineering Company, New Berlin, Wis.

Filed Sep. 2, 1986, Ser. No. 902,631

Int. Cl.[4] H01R *43/04*

U.S. Cl. 29—753 **6 Claims**



1. Apparatus for crimping a terminal onto a stripped end of a wire lead, comprising:

a frame;

an anvil positioned on said frame;

a die mounted on said frame so as to be slidable thereon in a predetermined direction, positioned so as to align with said anvil in said direction, and spaced apart from said anvil in said direction by at least a minimum clearance;

an actuator, for imparting reciprocating motion along said predetermined direction to link means;

said link means assembled to said die and said actuator for transferring said reciprocating motion from said actuator to said die, said link means having a variable length to allow alteration of the minimum clearance between said die and said anvil and comprising:

threaded length adjustment means for adjusting the length of said link means, and in turn for adjusting said minimum clearance, during setup and assembly of said apparatus; and

stepwise length adjustment means for adjusting the length of said link means between production runs of said apparatus.

4,707,914

METHOD OF CONNECTING TWO ELECTRIC LINES AND CONNECTION POINT PRODUCED THEREBY

Friedrich Schauer, Heroldsberg, Fed. Rep. of Germany, assignor to kabelmetal electro Gesellschaft mit beschränkter Haftung, Hanover, Fed. Rep. of Germany

Filed Mar. 24, 1986, Ser. No. 843,893

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1985, 3510370

Int. Cl.[4] H01R *43/00*

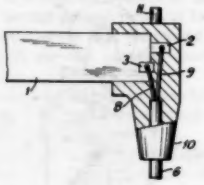
U.S. Cl. 29—872 **7 Claims**

1. In a method of producing an electrically conductive connection between conductors of a flat-conductor ribbon line, in which at least two flat conductors are arranged parallel to and spaced apart from each other within a common insulation, and conductors of a flexible connecting line which comprises at least two wires with stranded conductors surrounded by a common insulating jacket, the method comprising the steps of removing the insulation from the flat conductors of the

flat-conductor ribbon line to expose end portions of the flat conductors,

cutting the wires of the connecting line to different lengths to provide a shorter wire and a longer wire, the difference in length between the two wires being equal to the spacing between corresponding points of said end portions of the flat conductors,

removing insulation from the end of each of the wires to expose a stranded conductor in each of the wires,



placing each stranded conductor of each wire against and perpendicular to the end portion of a corresponding one of the flat conductors,

connecting each stranded conductor in electrically conductive manner to the respective end portion at a point of connection on the respective flat conductor, and then

moulding a protective body of insulating material around the points of connection of the two lines.

4,707,915

DRY-SHAVING APPARATUS WITH ANGLED BLADES

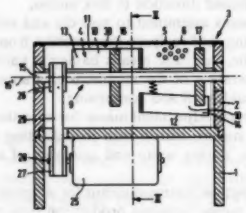
Eppe Bakker, and Albert Hoekstra, both of Drachten, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 16, 1986, Ser. No. 943,475

Claims priority, application Netherlands, Dec. 20, 1985, 8503520

Int. Cl.[4] B26B *19/14*

U.S. Cl. 30—43.6 **4 Claims**



1. A dry shaving apparatus comprising a housing having a holder for a shear plate formed with hair-entry apertures and a cutter which is rotatable about an axis of rotation, which cutter comprises a carrier with cutting elements which are movable relative to the carrier and which at their radial ends each comprise a cutting edge which extends between two axial ends of the cutting element, one axial end being more advanced in the direction of rotation than the other axial end, and which cutter is partly surrounded by the shear plate, every point of a cutting edge at the end of a cutting element of the cutter, as it rotates, following, as part of a revolution a constrained path defined by the shear plate and every point of a cutting edge following a circular free path about the axis of rotation when the radial ends are clear of the shear plate, characterized in that viewed in the direction of rotation at the more advanced axial end of the cutting element the radius of a circular free path of the cutting edge is smaller than the distance from the axis of rotation to the corresponding portion of the shear plate at the location where at said axial end the free path changes into the constrained path.

4,707,916

SHAVER HEAD FOR A DRY SHAVER

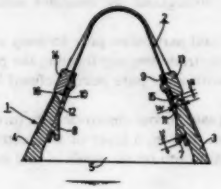
Werner Knees, Völkermarkt, and Karl Knees, Klagenfurt, both of Austria, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 28, 1986, Ser. No. 856,915

Claims priority, application Austria, May 2, 1985, 1311/85

Int. Cl.[4] B26B *19/02*

U.S. Cl. 30—43.92 **4 Claims**



1. A shaver head for a dry shaver comprising:

a shaver head frame having two longitudinal sections subtended by two opposite side walls, each of said longitudinal sections supporting on an inner surface thereof a downwardly extending hook member; and

a shaver foil having a perforated portion curved about a line midway between first and second longitudinal ends, said first and second longitudinal ends forming with said longitudinal sections an enclosure, said longitudinal ends including an aperture for receiving one of said hook members, and said longitudinal ends including above each of said apertures a projection attachment having an edge spaced apart from a respective longitudinal section a distance smaller than the depth of said hook member, said attachment having a width that is substantially the same as the width of an end of said longitudinal sections, whereby said perforated foil can be removed from said hooks by pressing sid foil longitudinal ends towards each other.

4,707,917

METHODS AND APPARATUS FOR CUTTING ROD-LIKE OBJECTS

Dwight G. Westover, 461 W. Orange Grove Ave., Sierra Madre, Calif. 91024, and Raymond M. McManaman, 1235 E. Comstock, Glendora, Calif. 91740

Filed Jan. 23, 1986, Ser. No. 821,894

Int. Cl.[4] B26B *17/00*

U.S. Cl. 30—182 **23 Claims**

13. Apparatus for cutting a rod-like object, comprising in combination:

means for suspending said apparatus from said object;

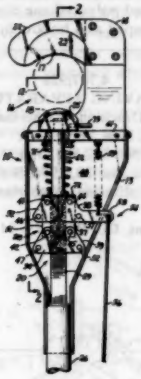
cutting means including a first cutting element combined with said suspending means, a second element complementing said first element for cutting said object, means for mounting said first and second elements relative to each other for a reception of said object therebetween;

an elongate handle for supporting said cutting means;

said cutting means including means connected to first and second elements for mounting said handle for rotation about a longitudinal axis thereof, and means at said handle for translating rotary motion of said handle into movement of said first cutting element into said object and toward said second element until said object has been cut; and

a selectively actuable quick release mechanism for selectively releasing said second element relative to said first cutting element, including means for releasing said means for translating rotary motion and means for rendering said handle translatorily movable along said longitudinal axis

relative to said release translating means, whereby said handle and said second element are manually movable



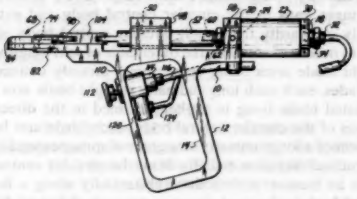
along said longitudinal axis without rotation of said handle.

4,707,918

POWERED CLIPPER FOR CITRUS FRUITS AND THE LIKE

Gerald D. Smith, Blythe, Calif., and Ben E. Werner, Golden, Colo., assignors to Agricultural Producers, Valencia, Calif.

Filed Feb. 28, 1986, Ser. No. 834,593
Int. Cl.[4] B26B *15/00*
U.S. Cl. 30—228 **7 Claims**



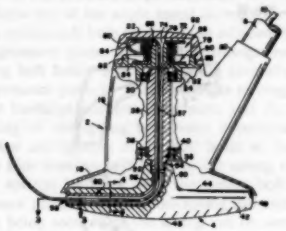
1. A manually held tool for severing the stems of fruit products and the like comprising, in combination, a support means including an end part having a conformation to engage the stem of a product to be severed, means including at least one cutting blade having a position to be moved relative to said conformation for severing the stem of the product, means providing a rotatable mounting for a part of the said cutting blade, driving means for said cutting blade positioned for rapidly rotating said part whereby to cause said blade to move rapidly relative to said conformation for severing the stem of a product, said driving means including power means having connections to said part whereby, upon the application of power to rapidly rotate said mounting means, said blade passes said conformation, said power means being in the form of an air-operated cylinder, a source of air under pressure, and manually operated valve means for supplying air to said cylinder for operating the tool, the said tool including means for securing the tool to the user's hand for one-handed operation, the said valve means being positioned for operation by the same hand of the user, the said securing means including means for attaching the tool to the user's wrist, and means for attaching said manually operated valve means to a finger of the user for operation of the valve means by the same hand of the user.

4,707,919

FLEXIBLE LINE CUTTING APPARATUS

William S. Tsuchiya, 1800-7th St., East Moline, Ill. 61244

Continuation of Ser. No. 632,972, Nov. 18, 1975, abandoned. This application Nov. 10, 1980, Ser. No. 205,300
Int. Cl.[4] B26B *27/00*
U.S. Cl. 30—276 **36 Claims**



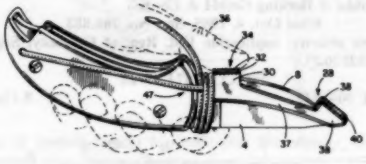
1. Apparatus for cutting vegetation and the like comprising: a member rotatable about an axis normal to a cutting plane; means forming a continuous passageway in said member extending from a first opening intersected by said axis to a radially spaced second, tubular opening intersected by said cutting plane; flexible line means extending through said passageway and including a first end portion extending outwardly from said first opening and secured externally of said member against rotation with said member, and a second, free traveling end portion extending outwardly from said second tubular opening, said line means being confined within said tubular opening and free to rotate about its own axis of elongation within said passageway as said member is rotated.

4,707,920

KNIFE WITH RETRACTABLE POINT PROTECTOR

Calvin W. Montgomery, 7 Baynard Cove Rd., Hilton Head, S.C. 29928

Continuation-in-part of Ser. No. 694,329, Jan. 24, 1985, Pat. No. 4,607,432. This application Jun. 9, 1986, Ser. No. 872,025
The portion of the term of this patent subsequent to Aug. 26, 2003, has been disclaimed.
Int. Cl.[4] B26B *29/00*
U.S. Cl. 30—294 **12 Claims**

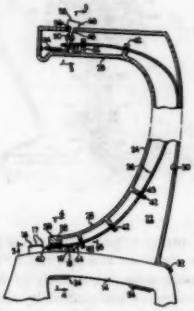


1. A cutting device comprising:
a knife having a blade and a handle, said blade including a cutting edge and a point,
point protector means pivotally mounted on said handle for preventing contact with said point when said cutting edge is moved away from an operator in a cutting operation,
stop means defined by said handle for locating said point protector means to prevent contact with said point,
said point protector means and said knife including securing means for securing said point protector means in position with respect to said blade,
said securing means including a first hole defined by said point protector means, a second hole defined by said knife and cord means passing through said first hole and said second hole for preventing said point protector means from moving relative to said blade.

4,707,921
EXTENSION HANDLE FOR A HANDHELD ELECTRICALLY POWERED TOOL

Burton C. Meyer, Downers Grove, and Fritz Fauser, Arlington Heights, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Aug. 4, 1986, Ser. No. 892,297
Int. Cl.[4] B26B *27/00*
U.S. Cl. 30—296 R **12 Claims**



1. An extension handle for an electrically powered, hand-held tool having a hand grippable portion and a back to front slidable, thumb actuatable on/off switch and a laterally moveable switch lock comprising:

a section attachable to the hand grippable portion of the tool and a spaced apart hand grippable section connected by a generally transverse section;

means depending from the attachable section for clamping over the hand grippable portion of the tool;

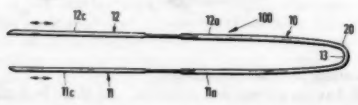
means actuatable from the hand grippable section and extending to the hand grippable portion of the tool for controlling the on/off switch on the hand grippable portion of the tool; and

a cam carried by the control means for sliding the switch lock laterally.

4,707,922
EATING IMPLEMENT

Barbara Hosak-Robb, Munich, Fed. Rep. of Germany, assignor to Robbe & Berking GmbH & Co. KG

Filed Oct. 4, 1985, Ser. No. 784,853
Claims priority, application Fed. Rep. of Germany, Sep. 4, 1985, 8525202[U]
Int. Cl.[4] A47J *43/28*
U.S. Cl. 30—322 **8 Claims**

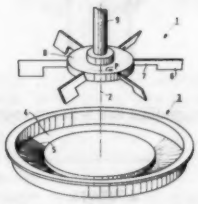


1. An eating implement comprising a tong-like shaped member (**10**) including two rod-shaped legs (**11**, **12**) extending approximately parallel to and spaced from one another and each having a first end and a second end with the first ends interconnected by a web (**13**), said web (**13**) being a resilient-elastic element (**20**) for automatically restoring said legs into the parallel position after the release of pressure displacing said legs toward one another, wherein the improvement comprises that the second ends of said legs are pointed, said legs in the direction between the first and second ends thereof have a slightly arcuate shape being bent out of a flat plane extending between the first and second ends in the manner of the curvature of fork tines, said legs having inwardly facing planar surfaces facing one another and outwardly facing rounded surfaces directed in the opposite direction, wherein said web comprises a resilient-elastic plastic part with a recovery power formed of a cross-linked polyurethane elastomer placed in the interior of the web shaped as a hollow body.

4,707,923
SHAVING APPARATUS

Eduard W. Tietjens, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 622,505, Jun. 20, 1984, abandoned.
This application Jan. 30, 1986, Ser. No. 824,027
Claims priority, application Netherlands, Jun. 23, 1983, 8302234
Int. Cl.[4] B26B *19/04*
U.S. Cl. 30—346.51 **2 Claims**



1. A shaving apparatus comprising a first cutting member having a circular central body; a second cutting member having a wall provided with hair-entry apertures, the first cutting member being associated with and rotatable relative to the second cutting member; a plurality of blades for engagement with the second cutting member; and a plurality of resilient longitudinally straight blade arms respectively connected at their inner ends to the circular central body and extending radially outwardly from such circular central body with respect to its axis of rotation, the outer ends of said longitudinally straight blade arms being respectively directly connected to the blades, each such longitudinally straight blade arm and its associated blade lying in a plane inclined in the direction of rotation of the circular central body; each blade arm being in the form of a longitudinally straight leaf spring extending in its longitudinal direction radially from the circular central body and in its transverse direction substantially along a helix extending both in the axial direction towards the second cutting member and in the direction of rotation; each such blade arm being flexible in directions at right angles to said inclined plane and rigid in directions parallel to said plane.

4,707,924
LOCKING HOLE PUNCH

Burrell T. Burney, DeWitt, Nebr., assignor to Peterson Manufacturing Co., Inc.

Filed Jun. 11, 1986, Ser. No. 872,958
Int. Cl.[4] B26F *1/06*
U.S. Cl. 30—363 **13 Claims**

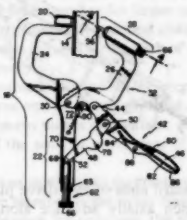
1. A locking hole punch for punching holes through a sheet comprising:

(a) An arm having head means at one end and a handle portion at the other end and an outwardly curved portion between the head and handle portions;

(b) a first lever outwardly curved in configuration and having adjustable punch means at one end with an operating axis transverse to the axis of the handle portion, said punch means including punching pin adjusting means for moving the punching pin relative to the opposing head, pivotably mounted at the other end to the arm at a pivot between the handle portion and its outwardly curved portion, said first lever and said arm pivotably movable

about the first pivot between open and working positions, so that in the open position the adjustable punch means is spaced from the head means, and in the working position the punch means cooperates with the head means and said outwardly curved portion and said outwardly curved lever form a closed perimeter, whereby said punch means and said head means can punch a hole in a sheet interposed between them;

(c) a second lever pivotably mounted at one end at a second pivot point spaced from the first pivot on the first lever and having a handle end, said second lever spaced from the handle portion of the arm in the open position and in hand-gripping relation to the arm in the closed position;



(d) toggle means pivotably mounted to the second lever at a third pivot and to the handle portion of the arm member at a fourth pivot point, said second lever adapted to drive the first lever rotatably at the second pivot about said first pivot from the open position to a working punching position when the second lever is driven toward the arm, said toggle means and said second, third, and fourth pivots so aligned to form a power line when the first lever is in the working position; and

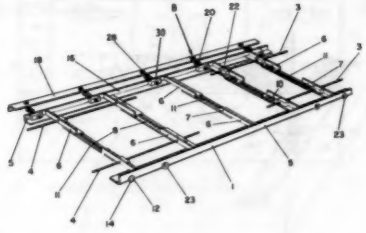
(e) biasing means connected between the handle portion of the arm and the first lever for returning the first lever and the second lever from the working position to the open position.

4,707,925

DOOR FRAME PATTERN DEVICE

Clem C. Englehart, 304 Animas St., Aztek, N. Mex. 87410

Filed Apr. 21, 1986, Ser. No. 853,869
Int. Cl.[4] E04F *21/00*
U.S. Cl. 33—194 **7 Claims**



1. A door frame pattern comprising:

a frame having two side beams and a plurality of cross beams, each cross beam being two slotted arms, wherein each slotted arm is rigidly affixed at right angles to one of the side beams, each of the slotted arms having a longitudinal slot, and the slotted arms being adjustably secured to an opposing slotted arm by bolts and nuts to form the cross beams, and

one of the side beams being designated the clearance rail having a clearance means with a lip protruding perpendicular to the plane of the invention, and

the other side beam being designated the spring rail having a plurality of spring bolt holes disposed along its length, and

a pressure plate being made of angle shaped metal, and having a plurality of spring bolt holes on one leg of the angle of the pressure plate metal, and having flex-cuts in the same leg of the angle metal through the diameters of each spring bolt hole except those adjacent to the ends of the pressure plate, and loose bushings inserted in the spring bolt holes, and spring bolts pivotally attached to the pressure plate by attaching bolts passing through the loose bushings and attaching nuts, and the number and spacing of the spring bolt holes cooresponding to the number and spacing of the bolt holes so that the spring bolts slide into the bolt holes in the spring rail, and

helical springs installed over the spring bolts biasing the pressure plate away from the spring rail and the pressure plate being secured to the spring rail by nuts on the portion of the spring bolts that protrude through the spring rail, and

a plurality of screw blocks affixed to the slotted arms adjacent to one end of the side beams, and a plurality of top screw rods adjustably threaded through the screw blocks, and

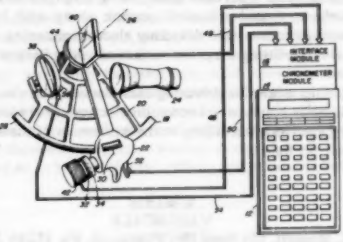
a plurality of screw blocks affixed to the slotted arms adjacent to the other end of the side beams, and a plurality of bottom screw rods adjustably threaded through the screw blocks.

4,707,926

AUTOMATIC SEXTANT

John A. Decker, Jr., Wailuki, Hi., assignor to Kuau Technology, Ltd., Puunene, Hi.

Filed Mar. 16, 1984, Ser. No. 590,473
Int. Cl.[4] G01C *1/08*
U.S. Cl. 33—267 **4 Claims**



1. A sextant system for indicating the angular separation between two objects, comprising

a sextant having a mirror means and a frame means connected at a pivot point to permit rotation of said mirror means and frame means relative to one another, and means for adjusting the angle between said mirror means and frame means to be indicative of the angular separation between said objects,

encoding means for generating angle signals indicative of said angular separation,

means for deriving said angular separation from said angle signals,

a memory for storing reference angle signals for a plurality of celestial bodies,

an indicator for alerting the user that said angle between said mirror means and frame means corresponds to said reference angle of a selected celestial body, and

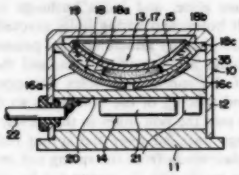
circuitry for comparing said angle signals and said reference angle signals and for triggering said indicator.

4,707,927

INCLINATION AND ACCELERATION SENSOR UTILIZING ELECTROSTATIC CAPACITIVE EFFECTS

Yasuhiro Hiyama, Higashimatsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Mar. 11, 1986, Ser. No. 838,473
Claims priority, application Japan, Mar. 18, 1985, 60-53966
Int. Cl.[4] G01C *9/06*; G01P *15/125*
U.S. Cl. 33—366 **12 Claims**



1. A sensor comprising:

a spherically shaped common electrode;

insulating member means, including a spherical portion facing said common electrode at regular intervals, for forming an enclosed spherical space by said spherical portion and said common electrode, said spherical space being a circular arc shape in its vertical shape and having a regular space width between an upper and lower spherical surface of said spherical space, said spherical portion having a uniform thickness;

dielectric viscous fluid, having a large surface tension, being contained in said spherical space and filling a part of said spherical space, said dielectric viscous fluid being able to move in a body in said spherical space in close contact with the upper and lower spherical surfaces of said spherical space;

a plurality of detecting electrodes which are electrically independent from each other, being arranged on the outer surface of said spherical portion along said insulating member means, said detecting electrodes having a spherical shape fitting the outer surface of said spherical portion; and

detecting means for detecting each variation of electrostatic capacity between the common electrode and each detecting electrode according to the movement of the dielectric viscous fluid.

4,707,928

VARI-SCALE

Roy L. Bennett, 146 Ange Dr., Pittsburgh, Pa. 15235; James A. Cianciosi, 5403 Black St., Pittsburgh, Pa. 15206, and William U. Clark, 5424 Fifth Ave., Pittsburgh, Pa. 15232

Filed Nov. 19, 1985, Ser. No. 769,257
Int. Cl.[4] G01B *3/02*
U.S. Cl. 33—491 **2 Claims**

1. Graduated engineer/architect rule, rotationally mounted within a housing comprising:

a graduated fabric sheet carried on platen guides and rollers; rotated by a drive platen mounted in said housing,

a graduated fabric sheet advancement means, centrally mounted within the housing, supported by spring tensioned plates which accommodate the ends of the drive platen axis, spans the length of the housing passes through the end frame plates and has sprocket gears to engage said sheet,

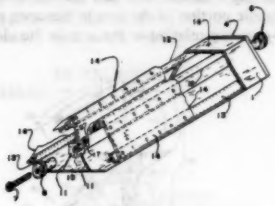
end frame assembly and support means fitted to housing ends to retain and permit rotation of platen and idler rollers, and to facilitate replacement of fabric sheets and allow fabric sheet tensioning,

graduated fabric sheet tensioning means by platen tensioning plates mounted on the inboard ends of the said drive platen, tensioned by springs anchored to end frames,

a full length scale viewing means providing low magnification and mounted to the working end of the front surface of the housing,

means of scale-type selection/configuration using a viewing window and cross hair fitted into the left end of the front surface of said housing and centered vertically along that surface,

end plate retention means using scale adjustment knobs fitted



to the outboard ends of said drive platen and retained by screws which axially advance along said drive platen, resulting in compression between said scale adjustment knob and the outer bearing surfaces of the end plates such that the scale adjustment knobs can also serve to permit rotation of the drive platen, and

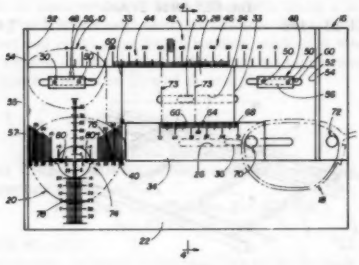
a graduated fabric sheet guidance means using two molded tapered guide platens held by the end frames at the lower inside edges of the housing adjacent to the working surfaces to precisely position the graduated fabric sheet at the viewing window.

4,707,929

INSTRUMENT FOR DETERMINING THE SETTING OF A LENS EDGER DEVICE TO PRODUCE A PROPERLY SIZED LENS

Jerry L. Bizer, and Raymond D. Carrig, Jr., both of 516 E. Hwy. 131, Clarksville, Ind. 47130

Filed Jun. 5, 1987, Ser. No. 58,767
Int. Cl.[4] G01B *5/00*
U.S. Cl. 33—507 **6 Claims**



1. An instrument for determining the setting of a lens edger device based upon the relationship between a lens pattern and the lens opening of a spectacle frame or dummy lens, comprising:

a base member;

a first slide member having two transverse ends slidably mounted to the base member for linear movement in both longitudinal directions of the first slide member;

lens pattern abutment means located on each transverse end of the first slide member;

a first scale on the base member adjacent to and extending along the linear path of movement of the first slide member, the first scale being centered on the transverse center of the path of movement of the first slide member;

means for both locating and retaining a lens pattern at each end of the first slide member with the longest horizontal dimension of the lens pattern in alignment with the path of movement of the first slide member;

lens pattern abutment means on the base member located at each end of the path of movement of the first slide member and spaced to the opposite side of the lens pattern locating and retaining means from the corresponding transverse end of the first slide member;

a second slide member having two transverse ends slidably mounted to the base member for linear movement in both longitudinal directions of the second slide member along a path of movement parallel to the path of movement of the first slide member;

a dummy lens abutment located on the second slide member at one transverse end of the second slide member;

dummy lens abutment means on the base member located at the one end of the path of movement of the second slide member;

spectacle frame lens opening engagement means located on the second slide member at the other transverse end of the second slide member for engaging the spectacle frame at one end of the diameter of the lens opening;

spectacle frame lens opening engagement means on the base member for engaging the spectacle frame at the other end of the diameter of the lens opening;

a second scale on the second slide member extending along the linear path of movement of the second slide member, the second scale being centered on the transverse center of the second slide member; and,

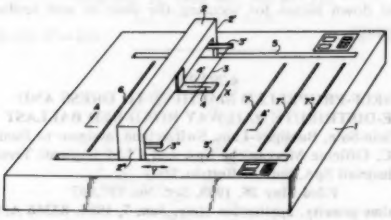
index means on the first slide member for registering with the first scale to indicate the longest horizontal dimension of the lens pattern positioned at either end of the first slide member and for registering with the second scale on the second slide member to indicate the setting for the lens edger device to produce a lens to fit the spectacle frame openings corresponding in shape to the lens pattern.

4,707,930

APPARATUS FOR MOUNTING A RELIEF PLATE FOR LETTERPRESS PRINTING

Masahiro Sugiura, Tokyo, and Michiyuki Yoshida, Saitama, both of Japan, assignors to Sakata Shokai, Ltd., Osaka, Japan

Filed Oct. 28, 1986, Ser. No. 928,296
Int. Cl.[4] B41B *1/00*
U.S. Cl. 33—623 **4 Claims**



1. An apparatus for mounting a relief plate for letterpress printing, which comprises:

a flat table for tautly fixing a carrier sheet;

a holding stand which extends across said flat table in the X-direction of a coordinate system and is movable in the Y-direction of the coordinate system;

a first drive means for causing said holding stand to move in the Y-direction;

a first cursor connected to said holding stand for indicating a position in the Y-direction;

a second cursor connected to said holding stand for indicating a position in the X-direction;

a second drive means for causing said second cursor to move in the X-direction;

a third drive means for causing the first and second cursors to move in a vertical direction; and

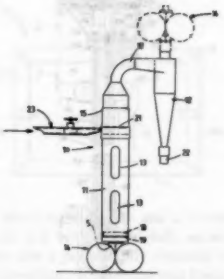
control means which are computer-programmed to control the movements of said first and second cursors in the X-, Y- and vertical directions.

4,707,931

APPARATUS AND METHOD FOR DRYING AND SEPARATION OF MATERIAL

Barry E. Stevenson, Hamilton, New Zealand, assignor to Ministry of Agriculture & Fisheries, Wellington, New Zealand

Filed May 8, 1986, Ser. No. 861,053
Int. Cl.[4] F26B *5/00*
U.S. Cl. 34—10 **11 Claims**



10. A method of drying anthers and separating pollen contained therein, which comprises the steps of placing pollen bearing anthers into a chamber; said chamber comprising an inlet for admission of air, an outlet from said chamber and a plate disposed above said inlet, said plate having a plurality of openings extending therethrough, said openings being arranged in a series of concentric circles about the center of said plate and being slanted or disposed at an angle relative to the horizontal axis of said plate and to the direction of incoming air; and thereafter passing a twisting stream of air through said chamber so as to disturb said anthers and release pollen therefrom.

4,707,932

ICE FISHING APPARATUS

Frank F. Sonnemaker, Box 101, Sunburst, Mont. 59482

Filed Feb. 17, 1987, Ser. No. 15,426
Int. Cl.[4] A01K *97/01*
U.S. Cl. 43—17 **22 Claims**

1. Ice fishing apparatus including a body portion, a supporting portion, a line storing portion, a connecting portion, a displaying portion and a triggering portion; said body portion including an elongated vertically oriented housing section, a cap member with a central opening and at least one drain opening therethrough disposed over a lower end of said housing section; said supporting portion including a plurality of leg members pivotally connected to said housing section intermediate its length, said leg members being pivotable from positions generally parallel to said housing section to positions generally radial thereof in a common transverse plane; said connecting portion including a shaft member disposed along the axis of said housing section and extending beyond the ends thereof, a lower end of said shaft member extending through said central opening in said cap member, an elongated sleeve section surrounding said shaft member, said sleeve section

extending from a point above said pivotal connection of said leg members with said housing section to a point adjacent to said cap member, a water tight seal disposed between said lower end of said sleeve section and said shaft member; said line storing portion including a reel member affixed to said lower end of said shaft member and rotatable therewith; said displaying portion including a wing section mounted on said shaft member above said housing section, the plane of said wing section lying along the axis of said shaft member, a handle section affixed to an upper end of said shaft member above said wing member; said triggering portion including a finger member extending outwardly from said housing section adjacent an upper end thereof, a transverse slot in said finger member in a part thereof overlapping said wing section, an elongated spring

member having a lower end connected to said housing section along the length thereof, an upper end of said spring member being selectively engageable with said transverse slot; whereby positioning said fishing apparatus in an opening cut through a layer of ice on the surface of a body of water with said leg members resting on the ice surface and said spring member engaging said slot in said finger member, a fish taking bait on the end of a line extending from said reel member will draw line from said reel member thereby rotating said shaft member affixed thereto and causing said wing section on the upper end of said shaft member also to rotate and push said spring member from said slot causing said spring member to move upwardly so that said rotating wing section and said upwardly extending spring member signal a fisherman that a fish has been caught.

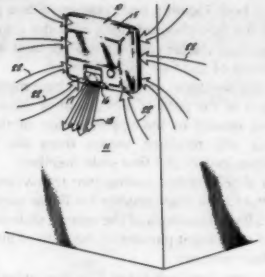
4,707,933

WALL MOUNTED DRYER

Henry C. Keck, Pasadena, and Roy K. Fujitaki, Altadena, both of Calif., assignors to Bobrick Washroom Equipment, Inc., North Hollywood, Calif.

Filed Apr. 30, 1986, Ser. No. 858,360
Int. Cl.[4] F26B *9/00*
U.S. Cl. 34—97 **6 Claims**

1. In a dryer for mounting on a wall, an improvement comprising; a housing means including a support frame and a cover mounted on the support frame, said support frame having air inlet means extending along and adjacent the wall, and said cover having a peripheral edge closely spaced from the wall around a substantial portion of the support frame for forming a narrow opening at said air inlet means for inhibiting the entry of foreign objects into the housing means said support frame and cover having cooperating top portions when mounted on



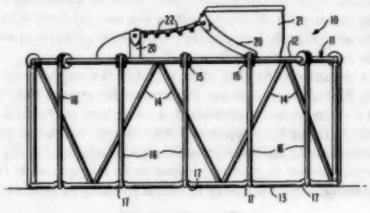
the wall to form a closed top for preventing the entry of foreign objects and water into the dryer from above the dryer.

4,707,934

JUMPING SHOE ATTACHMENT

LeRoy Hart, 9340 NE. 76th St., Vancouver, Wash. 98662

Filed Sep. 22, 1986, Ser. No. 909,721
Int. Cl.[4] A43B *3/10, 25/10*
U.S. Cl. 36—7.8 **12 Claims**



3. A jumping shoe attachment, for use with a shoe, having trampoline-like characteristics, comprising:

a frame having a bottom, ground engaging member, an open, planar, peripherally-extending top member, and brace means spacing said top member from said bottom member;

resilient means extending laterally inwardly from said top member to an area where the shoe is to be mounted to provide lateral resiliency thereto; and

hold down means for securing the shoe to said resilient means.

4,707,935

SELF-PROPELLED MACHINE TO DRESS AND RE-DISTRIBUTE RAILWAY ROAD BED BALLAST

Ivo Cicin-Sain, Bussigny-Laus, Switzerland, assignor to Danieli & C. Officine Meccaniche SpA and CLM Impianti Tecnici Industriali SpA, both of Buttrio, Italy

Filed May 28, 1985, Ser. No. 737,867
Claims priority, application Italy, Jun. 7, 1984, 83366 A/84; Jun. 7, 1984, 83365 A/84
The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.
Int. Cl.[4] E02F *5/22*
U.S. Cl. 37—105 **9 Claims**

1. A machine for dressing and distributing railway road bed ballast, comprising

a frame having forward and rear ends;

wheels for supporting the frame and engaging rails of a railway;

a dressing unit located near the front end of the frame, comprising:

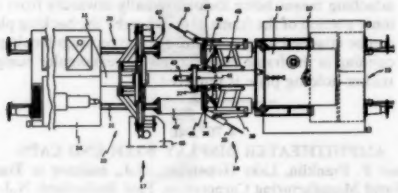
first and second support arms extending laterally from opposite sides of the frame, vertically adjustable with respect to the frame, each arm extending a variable distance outwardly from the frame; and

first and second rotary lateral dressing drums pivotably secured to the first and second support arms for shaping ballast at the sides of a railway;

a redistributing unit located rearwardly of the dressing unit, comprising:

third and fourth support arms extending laterally from opposite sides of the frame, vertically adjustable with respect to the frame;

first and second ploughs pivotably secured to the third and fourth support arms, said ploughs being pivotable in a horizontal direction;



a drum support, tiltable in a longitudinal direction with respect to the frame;

a transfer drum carried by said support, said transfer drum being vertically adjustable with respect to the frame, oriented to have a vertical axis which is tiltable with the drum support, and disposed beneath the frame and between the first and second ploughs; and

bridge elements for overlying rails of a railway to facilitate transfer of ballast over the rails; and

a brush unit located rearwardly of the redistributing unit, comprising:

a central cleaning unit vertically adjustably secured to the frame, disposed beneath the frame;

a rotary brush for engaging material thrown up by the central cleaning unit, and having a substantially horizontal axis; and

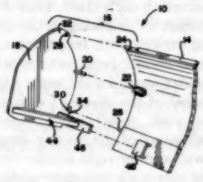
a chute means for collecting material engaged by the brush.

4,707,936

SNOW PLOW ATTACHMENT

Kenneth Steinhoff, 385 S. Wolf Rd., Wheeling, Ill. 60090

Filed Jul. 21, 1986, Ser. No. 887,212
Int. Cl.[4] E01H *5/06*
U.S. Cl. 37—264 **17 Claims**



14. In a snow plow having a vertically-oriented snow plow blade and a supporting and adjusting mechanism for attaching the blade to a vehicle, the improvement comprising a side attachment for the blade, the side attachment including

a. a side plate engaging one end of the blade,

b. an alignment pin secured to said side plate and a corresponding sleeve secured to the blade, said pin and sleeve being positioned for alignment of the side plate and the blade during assembly and use of the side attachment,

c. a pair of spaced dowels attached to the blade and extending laterally outwardly therefrom, an aperture in said plate in alignment with each of said dowels, and means for securing said dowels within said apertures for immobily securing the side plate to an end of the blade, said dowels being spaced from said pin and sleeve, and

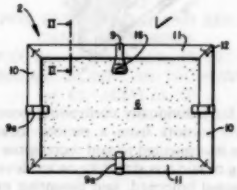
d. a brace disposed between the blade and the side plate for preventing lateral displacement of the side plate relative to the blade, said brace engaging a shoe secured to the blade.

4,707,937

ELEMENT FOR SECURING AND HANGING PICTURE FRAMES

Pietro Astolfi, Bologna, Italy, assignor to Pico-Glass, Italy

Filed Sep. 16, 1985, Ser. No. 776,323
Claims priority, application Italy, Sep. 21, 1984, 5041/84[U]
Int. Cl.[4] G09F *1/12*
U.S. Cl. 40—152.1 **3 Claims**



1. A clip for securing a picture and a covering sheet to a frame having top and bottom and side sections, said frame having on a front side a peripherally recessed seat for holding said picture and covering sheet so that said frame front side and said covering sheet are approximately flush, said frame also having a central rear opening bounded by said top and bottom and side sections, said clip comprising:

a bent resilient member having first, second, third, fourth and fifth portions, each portion being contiguously joined to the next successive portion,

said first portion being joined to said second portion at an angle of approximately ninety degrees, said first portion having a length sufficient to extend from an outer edge of said frame to slightly within the periphery of said recessed seat,

said second portion being joined to said third portion at an angle of approximately ninety degrees, said second portion being adapted to extend from said front to a rear side of said frame and not substantially further rearward,

said third portion being joined to said fourth portion at an angle of approximately ninety degrees in the forward direction generally toward said clip first portion, for resiliently and securely holding said clip and frame together,

said fifth portion being joined to said fourth portion at an angle and extending into said rear central opening in a direction generally parallel to said picture.

4,707,938

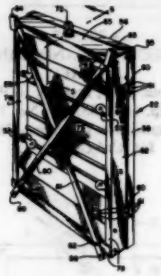
REMOTE CONTROL PRICE CHANGING SIGN

John F. Carssow, 12124 Drujon La., Dallas, Tex. 75244

Filed Jun. 13, 1986, Ser. No. 874,238
Int. Cl.[4] G09F *11/295*
U.S. Cl. 40—471 **16 Claims**

1. A changeable figure section for an elevated sign controllable from a remote location comprising: a changeable figure section in a rectangular box structure having a transparent front window; an upper roller and a lower roller rotatably mounted in the top and the bottom of said rectangular box structure; an upper and a lower motor in said box structure drive connected to said upper and lower rollers respectively;

an elongate panel of flexible material having a series of figures along the forward face thereof and upper and lower ends fastened to said upper and lower rollers, respectively, and windable on said upper and lower rollers to varying degrees in advancing the panel up and down to different figure displaying positions with the upper roller driven to draw the panel up when the upper roller is power driven by said upper motor and to draw the panel down when the lower roller is power driven by said lower motor; power supply means for said upper motor and power supply means for said lower motor; control means



line connected for individually controlling power fed to said upper and lower motors from a remote location; wherein mounting means is connected to said rectangular box structure for the mounting of said box structure on an elevated sign, such as a tower mounted billboard; said mounting means is in the form of criss-cross frame members fastened to the back of said rectangular box structure by fastening means; and with said criss-cross frame members formed with hooks at the top for support from a sign transverse frame member, and bottom ends extended beyond the bottom of said box structure for additional mount fastening to the sign.

4,707,939

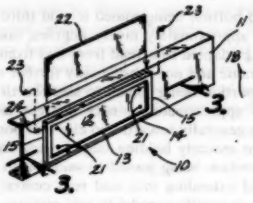
BUMPER STICKER REPLACEMENT BRACKET

Wayman A. Bonner, and Billie M. Bonner, both of 8925 NE. Fremont, Portland, Oreg. 97220

Filed Mar. 24, 1986, Ser. No. 843,492

Int. Cl.[4] G09F *21/24*

U.S. Cl. 40—591 **1 Claim**



1. Apparatus for displaying a bumper sticker comprising:

a vehicle bumper;

a backing plate, lying in a first place and having a top;

a frame plate, said frame plate comprising a rectangularly shaped member lying in a plane parallel to

means for forming an open top around the top of said backing plate, side plates, and frame plate;

a rectangular bumper sticker holding plate of a size smaller than the outer portion of the frame plate and larger than the rectangular shaped opening therein, said holding plate having a top, a top right corner and a top left corner;

a flexible bumper sticker adhesively attached to said rectangular bumper sticker holding plate so that it can be viewed through said rectangular opening in the frame plate when said rectangular bumper sticker holding plate is disposed between the backing plate and the frame plate while being supported by the bottom plate;

an opening disposed in the top portion of each side plate, respectively, above the top of said rectangular bumper sticker holding plate when said rectangular bumper sticker holding plate is resting on the bottom plate;

a first wire spring clip extending through said opening in the top portion of the right side plate in abutment with the top right corner of the frame plate for selectively holding the top right corner of the bumper sticker holding plate from coming out of the open top;

a second wire spring clip extending through said opening in the top portion of the left side plate and in abutment with the top left corner of the frame plate for selectively holding the top left corner of the bumper sticker holding plate from coming out of the open top; and

means for attaching the backing plate to said bumper, said attaching means being located radially inwardly from the inner portion of the frame plate whereby the backing plate can be attached by access through the rectangular shaped opening in the frame plate when said rectangular bumper sticker holding plate is removed.

4,707,940

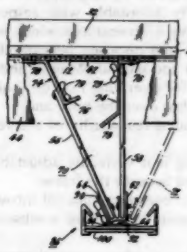
AMPHITHEATER DISPLAY WITH END CAPS

Robert P. Franklin, Lake Hopatcong, N.J., assignor to Trans-World Manufacturing Corporation, East Rutherford, N.J.

Filed Jan. 21, 1986, Ser. No. 821,170

Int. Cl.[4] G09F *7/00*

U.S. Cl. 40—605 **6 Claims**



1. A kit for forming a variable sized bay-shaped display, comprising:

(a) a plurality of planar rear wall sections;

(b) means for coupling said rear wall sections together to form a continuous rear wall;

(c) a plurality of bay dividers, each of said bay dividers including a pair of generally planar side panels which are hingedly connected to each other, each of said bay dividers including means for orienting, at the option of the user of said kit, said divider with respect to said rear wall in either a right end divider configuration wherein the right panel of the divider forms a right angle with said rear wall and said left panel of the divider forms an oblique angle with said rear wall, a left end divider configuration wherein the left panel of the divider forms a right angle with the rear wall and the right divider forms said oblique angle with said rear wall, or a central divider configuration wherein both said left and right panels form said oblique angle with said rear wall; and

(d) a plurality of end caps equal in number to the number of said dividers, each individual end cap having bracket means associated therewith which permit said individual end cap to be coupled to any one of said dividers, at the option of the user of said kit, whether said one of said dividers is arranged in said left end divider, said right end

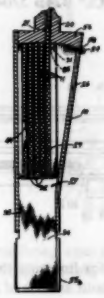
divider or said central divider configuration, said end cap covering the hinge of the divider to which it is attached.

4,707,941

BULK CARTRIDGE MAGAZINE FOR FIREARMS AND PROCESS FOR LOADING

Peter M. Eastman, 4701 Grouse Dr., West Richland, Wash. 99352

Filed Jun. 16, 1986, Ser. No. 874,645
Int. Cl.[4] F41C *25/02*
U.S. Cl. 42—50 33 Claims



1. A large capacity quick load magazine for firearm cartridges adapted to be mounted to the magazine well of a firearm and for receiving cartridges in bulk from a cartridge box, said magazine comprising:

a cartridge well interface means having a cartridge guide channel for receiving a column of cartridges and having a discharge opening;

a magazine case having an interface end joined to the interface means; said interface means being pivotally connected to said magazine case at the interface end thereof;

cartridge guide means within the magazine case having an open end for receiving a quantity of cartridges in a plurality of columns;

spring means associated with the guide means for selectively biasing columns of cartridges received by the cartridge guide means toward the interface means;

pivot means mounting the guide means and spring means within the housing for pivotal movement therein such that each column may be pivoted in succession into alignment with the cartridge guide channel of the interface; and

access means for exposing the guide means for bulk cartridge charging directly from the cartridge box; and

indexing means for actuating the pivot means to move successive columns into alignment with said cartridge guide channel in response to depletion of cartridges from columns previously aligned with said channel.

4,707,942

INTERCHANGEABLE BARREL FOR COLT SELF-LOADING PISTOLS

Franz J. Peters, Paderborn, Fed. Rep. of Germany, assignor to Pool Patent- und Lizenzverwaltungs-GmbH, Berlin, Fed. Rep. of Germany

Filed Jul. 19, 1984, Ser. No. 632,631
Claims priority, application Fed. Rep. of Germany, Jul. 22, 1983, 3326521
Int. Cl.[4] F41C *21/00*
U.S. Cl. 42—77 7 Claims

1. Interchangeable barrel for Colt self-loading pistols, comprising a barrel mounting rail, fixed to the frame, and a longitudinally oriented recess of circular arcuate undercut cross-section entering into the rail and being adapted to receive a clamping member, connected to the barrel at the rear bottom side thereof, characterized in that the clamping member (48) is

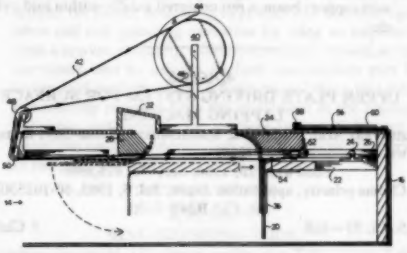
detachably and vertically adjustably connected to the barrel (12).

4,707,943

APPARATUS FOR ENTRAPPING AND RESTRAINING A GAME FARM BIRD

Carl Benigno, P.O. Box 72034, Roselle, Ill. 60172

Filed Apr. 20, 1987, Ser. No. 40,088
Int. Cl.[4] A01M *23/02*
U.S. Cl. 43—61 9 Claims



1. An apparatus for entrapping game farm birds comprising:

an enclosure having an open end and a closed end thereto;

a gate member mounted for pivotal motion on an axis arranged for lateral motion within said enclosure;

a projection member mechanically linked to said gate member to cause pivotal motion of said gate member in response to motion of said projection member;

a first abutment affixed to said enclosure proximate said open end and positioned for selective contact by said projection member; and

actuating means for selectively urging said gate member toward said first abutment to cause contact between said projection member and said first abutment, whereby said gate member is caused to pivot to an open position.

4,707,944

APPARATUS FOR HONING A CYLINDER

Edward K. Parsons, 866 Jackson Hwy., S., Toledo, Wash. 98591

Filed Feb. 18, 1986, Ser. No. 830,977
Int. Cl.[4] B24B *33/02*
U.S. Cl. 51—34 F 2 Claims

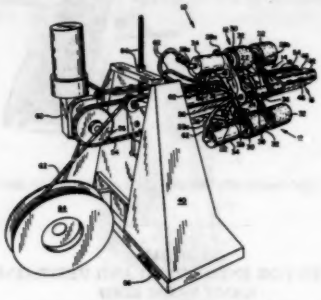
1. An apparatus for grinding or honing the inner cylinder wall of an elongate cylinder comprising:

(a) an elongate, stationary, non-rotating support beam independent of said cylinder extending substantially through the axial length of said cylinder;

(b) a non-rotating honing head movably supported on said support beam for axial movement within said cylinder;

(c) said honing head including two or more rotatable honing means for honing said inner cylinder wall, each of said honing means having respective power means operatively associated therewith for rotating said honing means;

(d) each of said honing means having respective resilient biasing means operatively associated therewith for resiliently urging said honing means toward said inner cylinder wall; and



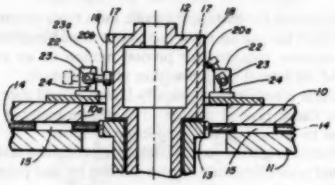
(e) bias regulating means for equalizing the pressure of said respective honing means against said cylinder wall when said support beam is not centered axially within said cylinder.

4,707,945

UPPER PLATE DRIVING SYSTEM FOR SURFACE LAPPING MACHINE

Hatsuyuki Arai, #2-5307-2, Komatsubara, Zama-City, Kanagawa-Prefecture, Japan (228)

Filed Jun. 20, 1986, Ser. No. 876,690
Claims priority, application Japan, Jul. 5, 1985, 60-102530[U]
Int. Cl.⁴ B24B *7/00*
U.S. Cl. 51—118 **5 Claims**



1. In an upper plate driving system for a surface lapping machine, which comprises:

said lapping machine having both an upper plate and a lower plate;

a cylindrical driver vertically mounted in a center section of said lower plate;

a plurality of driver slots uniformly distributed about the circumference of said driver, said slots being defined by a plurality of slot guides longitudinally positioned on said driver;

a plurality of lock arms firmly mounted on said upper plate and removably connected with said driver slots;

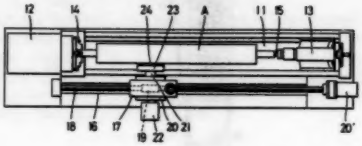
the improvement comprising: each lock arm being positioned in one of two groups of lock arms circumferentially separated by a phase angle equalling an integer times the angle of separation of said driver slots, and the lock arms of different groups having angular spacing from each other of said phase angle minus one half a pitch, where one pitch equals the angular distance between the center of a driver slot and that of an adjacent driver slot.

4,707,946

GRINDING MACHINE

Nobuyuki Hirohata, 180-8, Arimoto, Wakayama-shi, Wakayama-ken, Japan, assignor to Nobuyuki Hirohata, Wakayama, Japan

Filed May 2, 1986, Ser. No. 858,795
Claims priority, application Japan, Feb. 3, 1986, 61-22550
Int. Cl.⁴ B24B *5/04*
U.S. Cl. 51—129 **10 Claims**



1. A grinding machine for finishing the surface of a rod-like object which is rotated about an axis of rotation thereof, comprising:

a carriage movable in a first direction parallel to the axis of rotation of the rod-like object and movable in a second direction perpendicular to said first direction;

a shaft extending in said second direction and rotatably supported by said carriage, said shaft being rotatable about an axis parallel to said second direction;

a plate fixedly secured to said shaft for rotation therewith, said plate having a front side which is parallel to said first direction and facing the rod-like object;

a plurality of first grinding tools mounted on said front side of said plate at first positions equidistant from said axis of rotation of said shaft;

a plurality of second grinding tools mounted on said front side of said plate at second positions equidistant from said axis of rotation of said shaft, said second positions being spaced closer to said axis of rotation of said shaft than said first positions; and

means disposed on said carriage for adjusting the height of said grinding tools with respect to the axis of rotation of the rod-like object by raising and lowering said rotary shaft.

4,707,947

SHARPENING STONE FOR USE WITH A SABRE OR JIG SAW

Robert L. Harris, 2704 Broadmoor, Bryan, Tex. 77802

Filed Jul. 23, 1986, Ser. No. 888,710
Int. Cl.⁴ B24B *23/04*
U.S. Cl. 51—181 R **3 Claims**

1. In combination with a reciprocating saw motor having a reciprocating shaft operatively connected thereto and a chuck fixed to said shaft and adapted to receive the end of a saw blade, said chuck being provided with retaining means for retaining the end of a saw blade in said shaft;

a supporting member comprising a rigid rod portion having a flattened distal end shaped to fit said blade-receiving chuck,

a rigid extension integral with said rigid rod portion including supporting means extending at a 90° angle to said flattened distal end, and

an elongated rigid sharpening stone of abrasive material

secured on said rigid supporting member extension by said supporting means at a 90° angle to said flattened distal end,

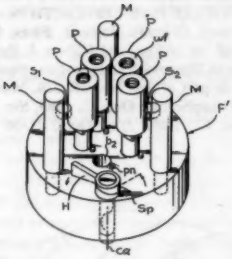
said sharpening stone being operable to be reciprocated by said saw motor for sharpening tools and instruments.

4,707,948

FLOAT LAPPING FIXTURE

Abbott M. Schindler, Chatsworth, and Otto Fuchs, Westlake Village, both of Calif., assignors to Unisys Corp., Detroit, Mich.

Filed Nov. 27, 1981, Ser. No. 299,086
Int. Cl.⁴ B24B *37/04*
U.S. Cl. 51—216 R **3 Claims**



1. A "floating lap" fixture wherein a plurality of work-mounting parts are individually and separately slide-mounted in a fixture body so as to each "float" on the lapping surface, biased theretoward only by its own weight; these parts comprising plungers for mounting magnetic recording sliders; with the fixture being supported on the lapping surface by three stop means, one of which is made height-adjustable.

4,707,949

METHOD FOR MANUFACTURING A SPECTACLE-GLASS FOR MYOPES

Lars Hellström, Mölndal, Sweden, assignor to Optimed N.V., Izegem, Belgium

Filed Jul. 15, 1986, Ser. No. 885,866
Claims priority, application Netherlands, Jul. 26, 1985, 8502142
Int. Cl.⁴ B24B *1/00*
U.S. Cl. 51—284 R **5 Claims**

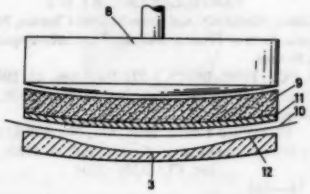
1. A method for manufacturing a spectacle-glass for myopes, starting from a semi-finished glass having on the inner side a slight concave center hollowing, which comprises:

a. computing according to the desired diopter value, the required basic curvature;

b. computing according to the desired field of view, a second curvature for the spectacle lens;

c. arranging the spectacle-glass in a generator, and center hollow milling the spectacle-glass according to the basic curvature;

d. thereafter milling the glass edge of the spectacle-glass around the center hollowing according to said second curvature;



e. finishing and polishing the center hollowing of the thus-treated spectacle-glass by using a tool with convex radiusing which corresponds to the basic curvature;

f. thereafter subjecting the edge of the spectacle-glass around the center hollowing to at least one finishing operation and one polishing operation by using an implement with a convex radiusing which corresponds to said second curvature, and by using a resilient intermediate part between said implement and a finishing polishing pad while transmitting pressure from the implement to the finishing polishing pad through the resilient intermediate part to allow the resilient intermediate part to follow the curves of the glass during finishing and polishing.

4,707,950

RING GRINDING TOOL

Katsuhiro Kawasaki, Uji, Japan, assignor to Toho Yogyo Kabushiki Kaisha, Shiga, Japan

Continuation-in-part of Ser. No. 854,717, Apr. 16, 1986, abandoned, which is a continuation of Ser. No. 561,398, Dec. 14, 1983, abandoned. This application Dec. 1, 1986, Ser. No. 936,385
Int. Cl.⁴ B24D *11/00*
U.S. Cl. 51—401 **3 Claims**

1. A ring grinding tool suitable for use in grinding or polishing a workpiece, comprising

a supporting rubber-made layer reinforced with a metal wire, having an inner surface for contacting a rotary member and having a thickness of 2 to 4 mm;

at least one porous elastic layer on the outside of said supporting layer and having a thickness of 8 to 10 mm, said porous elastic layer being made of natural rubber or styrene-butadiene rubber;

at least one elastic protective rubber sheet layer on the

outside of said porous elastic layer and having a thickness of 0.8 to 1.0 mm, said rubber sheet being made of natural rubber or styrene-butadiene rubber; and

a plurality of flat abrasive members secured to the outside of said elastic protective layer and spaced from each other to allow independent movement of the abrasive members, said protective rubber sheet layer conveying elastic force from said elastic layer to said abrasive members to allow said ring grinding tool to conform substantially to a curved surface of a workpiece.

4,707,951
INSTALLATION FOR THE PROJECTION OF PARTICLES OF DRY ICE

Claude Gibot, Malakoff, and Jean-Michel Charles, Marolles-en-Hurepoix, both of France, assignors to Carboxyque Francaise, Paris, France

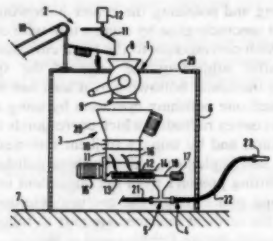
PCT No. PCT/FR86/00029, § 371 Date Sep. 25, 1986, § 102(e) Date Sep. 25, 1986, PCT Pub. No. WO86/04536, PCT Pub. Date Aug. 14, 1986

PCT Filed Feb. 4, 1986, Ser. No. 918,822

Claims priority, application France, Feb. 4, 1985, 85 01487

Int. Cl.[4] B24C *3/04*

U.S. Cl. 51—410 **9 Claims**



1. A dry ice blasting installation comprising an apparatus for producing particles of dry ice, said apparatus having an outlet, a vehicle gas conduit having an outlet nozzle, a propelling device disposed in said conduit, and a matering device for delivering a metered flow of said particles into said propelling device, said metering device having an inlet disposed below and spaced from said outlet whereby said particles are allowed to drop by gravity from said apparatus into the metering device, and a cover which surrounds said outlet of said apparatus and every part of the installation where particles are exposed to the surrounding atmosphere except for said outlet nozzle, so as to protect said particles from humidity until they are blasted out of said nozzle.

4,707,952
LIQUID/ABRASIVE JET CUTTING APPARATUS

Eugene L. Krasnoff, Somerville, N.J., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Oct. 1, 1986, Ser. No. 914,062

Int. Cl.[4] B24C *5/00*

U.S. Cl. 51—410 **13 Claims**

1. Liquid/abrasive jet cutting apparatus, comprising:

a source of liquid;

a jet-cutting nozzle;

means, in fluid communication with both said source and said nozzle, for (a) pressuring liquid, and (b) pumping pressurized liquid to said nozzle; and

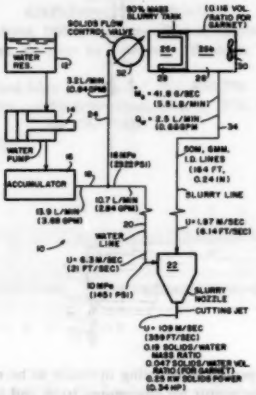
a source of slurry; wherein

said liquid pressurizing and pumping means comprises means for (c) pressuring slurry, and (d) pumping pressured slurry to said nozzle;

said source of slurry comprises a reservoir; and further including

means sealingly subdividing said reservoir into a pair of chambers; wherein

said subdividing means comprises a wall movably disposed in said reservoir for varying the volumes of said chambers; and



said liquid pressurizing and pumping means comprises means for conducting pressure liquid to one of said chambers of said pair for effecting, as a consequence thereof, movement of said wall within said reservoir, and a resulting, concomitant diminution of the volume of the other chamber of said pair.

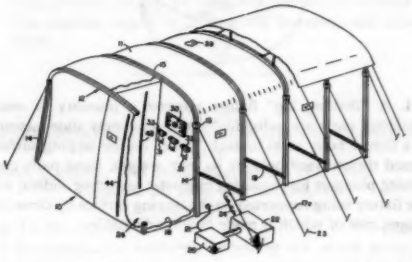
4,707,953
EXPANDABLE SHELTER SYSTEM PROVIDING COLLECTIVE PROTECTION

Robert D. Anderson, Orlando; John D. Estes, DeLand; John Carta, Maitland, all of Fla., and Gilbert J. Page, Baltimore, Md., assignors to Brunswick Corporation, Skokie, Ill.

Continuation-in-part of Ser. No. 480,230, Mar. 30, 1983, abandoned. This application Oct. 22, 1985, Ser. No. 790,132

Int. Cl.[4] E04B *1/12*; G08B *21/00*

U.S. Cl. 52—63 **15 Claims**



1. An expandable, free-standing, portable, quickly erectable and strikable, utility shelter with an outside support framework and providing collective protection against nuclear fallout and optional protection against chemical and biological agents comprising:

a plurality of inverted U-shaped structural rib members in a parallel relationship, each of said rib members having a plurality of faces, one of said faces facing toward the inside of said shelter;

a series of reinforcing members, one of said reinforcing members connecting each adjacent pair of ribs on each side of said shelter, said reinforcing members being operative to push said rib members together in abutting relationship or to pull them apart in spaced relationship and to stabilize and maintain parallel physical relationship between said rib members;

a substantially air-tight enclosure attached to said inside faces of said rib members, said enclosure enclosing a main chamber of said shelter and comprising:

a flexible cover attached to said inside faces of said rib members, said cover comprising a chemical agent resistant material; and

an integral fabric floor attached to said flexible cover; and

a pressurizing means connected to said flexible cover for optionally pressurizing said main chamber of said shelter to a pressure substantially one inch water gauge more than ambient pressure, said pressurizing means comprising power conducting means for optionally turning on and operating said pressurizing means in order to insure that, when said pressurizing means is turned on, air enters said shelter only from said pressurizing means and that all other air flow is out of said shelter, said pressurizing means comprising a blower capable of pressurizing said main chamber of said shelter to a pressure of substantially one inch water gauge and said power conducting means comprising a power line cord which optionally may be plugged into a suitable electric power source;

wherein said shelter has a generally rectangular floor plan and said shelter comprises two internal chambers, the first said chamber being a protective air lock arranged and adapted to function as a purge chamber and the second said chamber being a main chamber arranged and adapted optionally to maintain a clean environment free of chemical and biological agents, said air lock being located in one corner of said shelter, said air lock comprising two doors, one leading to the outside environment and one leading into said clean environment of said main chamber of said shelter, said main chamber comprising an L-shaped chamber;

pressure leakage means connecting said airlock and said main chamber, said pressure leakage means being arranged and adjusted to pressurize said air lock to a pressure substantially one-half inch water gauge above ambient pressure and substantially one-half inch water gauge below the said pressure of said main chamber of the shelter, said pressure leakage means comprising at least one pressure leakage hole mounted in the wall between said air lock and said main chamber, said pressure leakage means comprising a fabric flap mounted over said leakage hole and arranged and positioned so as to be capable of covering said hole optionally; and

a purge timer having means for presetting a predetermined purge cycle time and means for timing elapsed time, and an indicator panel mounted in said air lock, said indicator panel comprising audio signal means and visual signal means, said timer being operatively connected to said indicator panel and arranged and adjusted to time said elapsed time a person has been inside the air lock and to cause said indicator panel to provide both an audio signal and a visual signal when said predetermined purge cycle time has elapsed and it is safe to enter the main chamber of the shelter;

whereby said pressurizing means optionally may be turned on and operated when protection against chemical or biological agents is considered necessary or desirable.

4,707,954

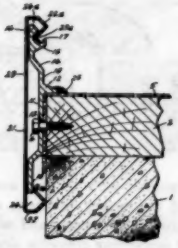
ROOF EDGE FASCIA SYSTEM

William J. Butzen, N57 W15167 Mesa Dr., Menomonee Falls, Wis. 53051

Filed Mar. 3, 1986, Ser. No. 835,152

Int. Cl.[4] E04B 7/00

U.S. Cl. 52—96 **3 Claims**



1. A roof edging mechanism for securing the edge of a waterproof membrane overlying a roof which comprises

a longitudinally extending base member adapted to be secured to the edge of a roof to clampingly engage the edge of a waterproof membrance at said roof edge, said base member comprising a metal extrusion and including an upwardly extending portion and a downwardly extending portion, said upwardly extending portion having a top flange, a bottom flange, and a yoke portion connecting said flanges along one side thereof, the opposite sides of said flanges being arranged to form a channel and said top flange having a ridge projecting into said channel, and

a longitudinally extending and transversely symmetrical fascia member for covering said base member comprising a sheet of resilient metal material and including a vertical portion having an upper edge and a lower edge, said fascia member including means adapted to interlockingly engage said fascia member with said base member, said fascia member engagement means comprising a bent-over open mouth portion and a reverse bent-over lip portion at the upper edge of said vertical fascia portion and bent-over open mouth portion and a reverse bent-over lip portion at the lower edge of said vertical fascia portion, said upper edge bent-over open mouth and reverse bent-over lip portions being symmetrically opposed to said lower edge bent-over open mouth and reverse bent-over lip portions and both of said bent-over open mouth portions being adapted to engage either of the said upwardly extending top flange or the said downwardly extending base member portion and both of said reverse bent-over lip portions being adapted to engage said upwardly extending base member channel and projecting top flange ridge whereby said fascia member comes into operative interlocking engagement with said base member.

4,707,955

SCREED RAILS

John D. Clapson, Eastleigh, United Kingdom, assignor to Square Grip Limited, London, United Kingdom

Filed Jul. 1, 1985, Ser. No. 750,354

Claims priority, application United Kingdom, Jul. 4, 1984, 8416971

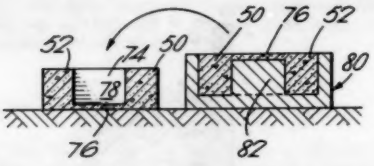
Int. Cl.[4] E04B 1/00

U.S. Cl. 52—98 **10 Claims**

1. A screed rail formed of precast concrete comprising:

first and second spaced apart beams defining top and bottom portions of the rail, said first and second beams having, respectively, an upper surface and a lower surface which have been formed by molding them against opposing sides of an open-top mold;

a plurality of supporting elements extending between the beams substantially within the width of the rail, and said supporting elements and beams having side surfaces which define a side portion of the rail, said supporting elements being successively spaced apart along the length of the rail; and,



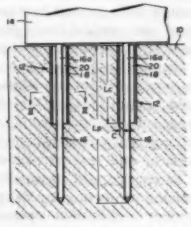
a plurality of frangible webs that are unreinforced and thinner than said supporting elements, said frangible webs extending between the beams and within spaces formed between said supporting elements along said side portion of the rail, said side portion of the rail and outer surfaces of the frangible webs having a substantially coplanar surface permitting forming by screeding.

4,707,956

EARTHQUAKE INSULATING BUILDING STRUCTURE

Takanori Sato, Tokyo, Japan, assignor to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed Jul. 16, 1986, Ser. No. 886,540
Claims priority, application Japan, Aug. 12, 1985, 60-177066; Aug. 24, 1985, 60-185994; Aug. 24, 1985, 60-185995
Int. Cl.[4] E02D *27/34*
U.S. Cl. 52—167 12 Claims



1. An earthquake-insulating building structure including a structure body and a foundation supporting said structure body, said foundation having a plurality of earthquake-insulating piles embedded within the ground, each of said piles comprising:

a pile body having upper and lower portions, the upper portion being connected to said structure body; and

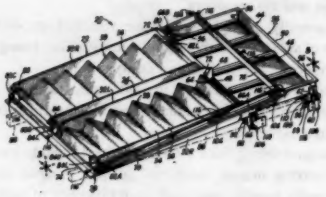
a cylindrical casing embedded in the ground having an inner face concentrically surrounding the upper portion of said pile body so as to form a space between said upper portion of the pile body and said inner face of the casing, said space retaining the upper portion of the pile body to be free from constraint of the ground so that said building structure has a natural vibration period thereof substantially longer than the vibration period of general earthquakes.

4,707,957

PREASSEMBLED PLATFORM STAIRWAY

John D. Shepherd, 13301 Cedar Creek Ct., Lockport, Ill. 60441

Filed Aug. 20, 1986, Ser. No. 900,549
Int. Cl.[4] E04F *11/06*
U.S. Cl. 52—183 11 Claims



1. A preassembled platform stairway for installation in a staircase between floors of adjacent levels, said stairway comprising in combination:

upper and lower stair runs each including stringers and treads and each having upper and lower ends;

a landing adapted to be installed in said staircase at an intermediate level between said adjacent levels; and

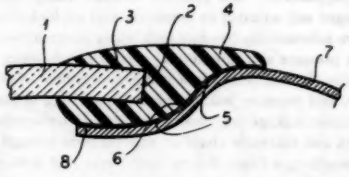
the improvement in accordance with which the upper end of said lower run and the lower end of said upper run are each pivotally connected to said landing for pivotal movement between first positions generally aligned with said landing and second positions in which said runs extend angularly from said landing upwardly and downwardly respectively to said adjacent levels.

4,707,958

FIXED-PANE MOTOR-VEHICLE WINDOW AND METHOD OF INSTALLING SAME

Günter Armbruster, Düsseldorf, Fed. Rep. of Germany, assignor to Flachglass Aktiengesellschaft, Furth, Fed. Rep. of Germany

Filed Sep. 13, 1985, Ser. No. 775,841
Claims priority, application Fed. Rep. of Germany, Sep. 15, 1984, 3434026
Int. Cl.[4] E06B *3/00*
U.S. Cl. 52—208 14 Claims



1. A method of mounting a rigid window pane having an edge into a rigid window opening having a rigid border, the method comprising the steps of sequentially:

fitting to the edge of the pane an annular and thermoplastically and permanently deformable gasket formed of a thermoplastic or heat-curing synthetic resin and having an external portion having an outer surface carrying a layer of adhesive;

fitting the pane oarrying the gasket to the window opening with the adhesive layer engaging the opening border;

simultaneously

pressing the pane carrying the gasket to the window opening,

heating and softening at least the portion having the outer surface of the gasket, and

plastically deforming and complementarily fitting the

pane to the opening border; and thereafter simultaneously

cooling and curing the gasket, and

pressing the pane carrying the gasket to the window opening

until the gasket hardens and permanently retains the shape imparted to it by the heat and pressure.

4,707,959

STRUCTURAL ASSEMBLIES SUCH AS CURTAIN WALLING

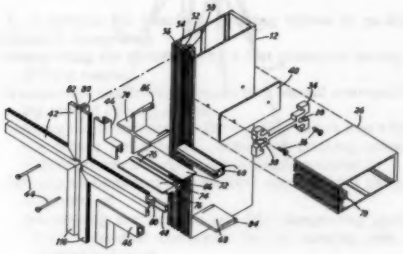
Richard L. Stoakes, "Clouds" Northdown Road, Woldingham Surrey, England

Filed Feb. 25, 1986, Ser. No. 832,596

Claims priority, application United Kingdom, Feb. 28, 1985, 8505155

Int. Cl.[4] E04H *1/00*

U.S. Cl. 52—235 **14 Claims**



1. A structural assembly comprising a series of elongate main frame members forming a wall framework, said members comprising a series of essentially vertically extending members and a series of essentially transversely extending members that jointly define a plurality of cells in the framework, respective panels infilling said cells, a series of auxiliary frame members extending forwardly of the main frame members for retaining the infill panels in their cells, securing screws extending through said auxiliary members and into said vertically and transversely extending main members to secure auxiliary members to the main members, means carried by said auxiliary frame members for sealing the infill panels in their cells, said sealing means being pressed into sealing contact with the infill panels by the tightening of the securing screws, a series of discrete support elements for said panels and means holding said support elements projecting forwardly from at least some of the transversely extending main frame members for supporting the infill panels at least temporarily prior to securing the auxiliary frame members finally to the main frame members.

4,707,960

CEILING INSULATION AND METHOD OF INSTALLATION

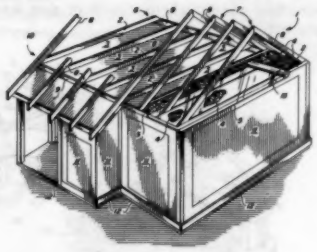
Christopher A. Bullock, 3321 Pines Rd., Shreveport, La. 71119

Filed Feb. 6, 1984, Ser. No. 577,525

Int. Cl.[4] E04B *1/74*

U.S. Cl. 52—404 **13 Claims**

1. A ceiling insulation structure for an attic comprising ceiling joists disposed in spaced relationship in said attic to define parallel spaces; ceiling means secured to said ceiling joists and spanning said ceiling joists; insulation means resting on said ceiling means and disposed between said ceiling joists in said spaces; and flexible water vapor-permeable plastic film having a thickness in the range of from about 0.5 mills to about



12 mils covering said joists and said insulation, whereby said insulation is substantially isolated from air currents in said attic.

4,707,961

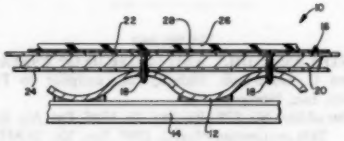
COMPOSITE ROOF/ROOF DECK ASSEMBLY WITH POLYMERIC MEMBRANE

C. Lynn Nunley, Dallas, and Joe W. Tomaselli, Plano, both of Tex., assignors to Loadmaster Systems, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 757,122, Jul. 19, 1985, which is a continuation of Ser. No. 330,335, Dec. 14, 1981, abandoned, which is a continuation of Ser. No. 603,892, Aug. 11, 1975, abandoned, which is a continuation-in-part of Ser. No. 231,642, Mar. 3, 1972, abandoned. This application Oct. 18, 1985, Ser. No. 788,796

Int. Cl.[4] E04B *5/00*; E04C *1/00*; B32B *7/04*

U.S. Cl. 52—408 **19 Claims**



1. A composite roof/roof deck assembly comprising a substantially rigid substrate layer; a substantially continuous polymeric sheet disposed over said substrate layer; and a water based, polymeric adhesive comprising: methanol, dionized water, acrylic acid polymer, sodium hydroxide, polyvinyl alcohol/vinyl acetate, polyisoprene latex, and aluminum silicate disposed between said substrate layer and said polymeric sheet to join said substrate layer to said sheet.

4,707,962

CASCADE WALL STRUCTURE

H. Joe Meheen, Denver, Colo., assignor to Meheen Engineering Corp., Denver, Colo.

Filed Feb. 25, 1986, Ser. No. 833,100

Int. Cl.[4] E04B *1/02*

U.S. Cl. 52—565 **5 Claims**

1. A modular outdoor wall construction comprising:

at least a first pair of contiguous identical vertically stacked members wherein each of said members includes:

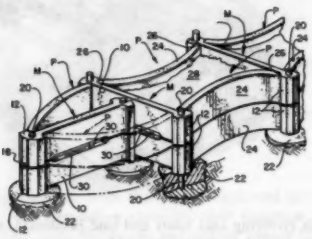
a planar body portion having a generally rectangular configuration having a height defined by spaced parallel upper and lower edges and which includes opposite ends;

an enlarged rib formed along each opposite end, each said rib joining each said end along a radial concave abutment surface means, each forming a cove;

aligned vertical passageways through each of said ribs of said stacked members;

an anchoring rod extending through said passageways for securing said stacked members in aligned contiguous relationship;

at least a second pair of contiguous identical vertical stacked intermediate panels wherein each of said intermediate panels includes;



a curved planar member having spaced upper and lower parallel edges defining a height substantially equal to the height of each of said first stacked members; and

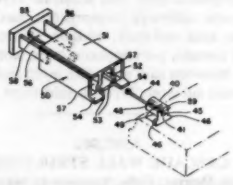
opposite parallel rounded ends which nest in said cove of said respective ribs of said stacked members in any one of a plurality of angular relationships with said vertically stacked members to form said wall construction.

4,707,963

MUNTIN ASSEMBLY AND METHOD OF INSTALLING

Bernard C. Governale, Duluth, Ga., assignor to Peachtree Doors, Inc., Norcross, Ga.

Division of Ser. No. 879,193, Jun. 26, 1986, Pat. No. 4,665,663.
This application Mar. 3, 1987, Ser. No. 20,542
Int. Cl.[4] E06B *3/68*; E04C *2/38*
U.S. Cl. 52—741 **4 Claims**



1. A method of installing a muntin bar assembly within the exterior frame of a sliding door or window sash comprising:

forming recesses in the ends of the muntin bars of said assembly and installing clip elements in the recesses,

placing anchor elements one at a time within a holding and stabilizing chamber of an implement body and placing one end of the implement body into stabilized engagement with a frame member of a window sash or door,

operating a driver guidingly engaged with the implement body to engage and drive a nail provided on the anchor element into the inner margin of said frame member,

removing the implement body and driver, and

completing the installation by moving the clip elements of the assembly into interlocked engagement with said anchor elements.

4,707,964

METHOD OF PROVIDING SUPPORT FOR AN ELONGATED TOWER LEG

Robert M. Hoyt; Edward Dziedzic, and William M. Rinehart, all of Centralia, Mo., assignors to A. B. Chance Company, Centralia, Mo.

Division of Ser. No. 489,861, Apr. 29, 1983, Pat. No. 4,561,231.
This application Oct. 18, 1985, Ser. No. 789,104
Int. Cl.[4] E02D *27/00*
U.S. Cl. 52—742 **3 Claims**

1. A method of providing support for an elongated tower leg, comprising the steps of:

providing an elongated screw anchor having a lower, elongated shaft portion and an outwardly extending, helix-defining, load-bearing element affixed in transverse relationship to the longitudinal axis of said shaft portion;

rotating the shaft portion while said load-bearing element is in contact with the earth to at least partially imbed said screw anchor in an upright position in the ground;

interrupting the rotation of said shaft portion of said anchor to position an upper portion of said anchor having cavity defining structure at any selected one of a number of different elevations relative to the level of the ground;

securing a plug in said anchor cavity at the upper portion of said anchor in transverse relationship to the longitudinal axis of the latter;

filling at least a portion of the anchor cavity with an initially flowable material which after said filling will harden and set, said step of filling said cavity occurring subsequent to said step of securing said plug in said anchor cavity;

placing a first end portion of an elongated tower leg connector member into the material-filled cavity, prior to hardening and setting of said material;

positioning said member in said cavity as necessary to properly align the member for later securement to said tower leg, thereby compensating for installation error of said anchor;

maintaining said member in said proper alignment until said material has sufficiently hardened and set to maintain said member in said proper alignment; and

connecting a second end portion of said member remote from said first end portion to said tower leg.

4,707,965

PROCESS FOR ATTACHING DRINKING STRAWS TO PACKAGING CONTAINERS AND APPARATUS FOR CARRYING OUT THE PROCESS

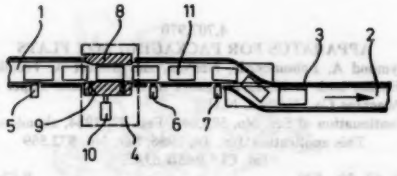
Gert Becker, Bremen, Fed. Rep. of Germany, assignor to Overbeck GmbH & Co., Bremen, Fed. Rep. of Germany

Filed Sep. 12, 1986, Ser. No. 906,366

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1985, 3532839

Int. Cl.[4] B65B *61/00*

U.S. Cl. 53—410 **11 Claims**



1. A process for attaching drinking straws to packaging containers, comprising

transporting the containers by a first conveyor having first driving means,

transporting the drinking straws by a second conveyor having second driving means,

entering the containers and the drinking straws into a fastening device for attaching individual drinking straws to individual containers at a controllable moment,

defining said moment by a method selected from the group consisting of

determining the position and the transporting speed of said individual containers before entering into said fastening device,

and determining the relative position of said individual containers in relation to said first conveyor, and

attaching said individual drinking straws to said individual containers at the moment defined before.

4,707,966

CONTAINER WITH AN ENCAPSULATED TOP INSERT AND METHOD AND APPARATUS FOR MAKING SAME

Gerhard H. Weiler, South Barrington; Paul A. Anderson, Arlington Heights, and Kenneth A. Fox, Lake Zurich, all of Ill., assignors to Automatic Liquid Packaging, Inc., Woodstock, Ill.

Filed Aug. 26, 1981, Ser. No. 296,368

Int. Cl.[4] B65B *3/02, 43/00, 61/22, 61/18*

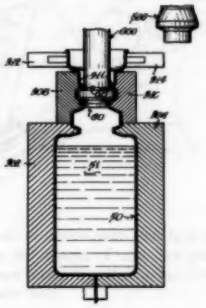
U.S. Cl. 53—410 **24 Claims**

1. In a method for forming an upright container from an extruded length of parison in the form of a vertically oriented, elongated, hollow tube positioned in a closed main mold while maintaining an opening at the top of the remaining length of parison above the closed mold for accommodating an inserted blowing and filling assembly by which the container is molded and filled, for thereafter removing said blowing and filling assembly from said parison top opening, and for then sealing the top of the molded and filled container;

the improvement in the method characterized in that, after said blowing and filling assembly is removed from said parison top opening and before said container top is sealed, the following additional steps are effected:

(A) temporarily continuing to maintain said top opening in said parison to provide access to the interior of said container; and

(B) during step (A) and prior to sealing the container top, performing a secondary operation at the parison top opening by effecting at least one step selected from the following group of steps: (i) introducing an auxiliary component in said parison top opening, (ii) introducing an additive through said top opening into said container, and (iii) introducing a forming device within said parison top opening.



4,707,967

Patent Not Issued For This Number

4,707,968

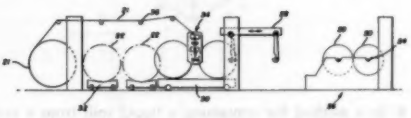
METHOD AND APPARATUS FOR WRAPPING PRESSURE SENSITIVE ROLLS OF MATERIAL

Joseph P. Vosters, Green Bay, Wis., assignor to Appleton Papers Inc., Appleton, Wis.

Filed Jul. 17, 1986, Ser. No. 886,432

Int. Cl.[4] B65B *11/04*

U.S. Cl. 53—430 **20 Claims**



1. An apparatus for wrapping pressure sensitive rolls of material, comprising

winding means for winding a plurality of rolls of pressure sensitive material on winder shafts, said plurality of rolls being separated by spacers on each shaft;

intermediate transfer cart means for accepting said winder shafts from said winding means, said intermediate transfer cart being movable from a location at said winding means to a foam application location;

means for transferring said plurality of pressure sensitive rolls from said winding means to said intermediate transfer cart means;

means for driving said winder shafts on said intermediate

transfer cart means, wherein said plurality of pressure sensitive rolls are rotated without contacting the periphery thereof; and

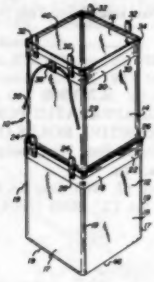
foam application means for applying a layer of foam to said plurality of rotated pressure sensitive rolls on said intermediate transfer cart means at said foam application location.

4,707,969

METHOD FOR SPILL CONTAINMENT

Thomas F. Marino, 26 Hydelor Ave., Prospect, Conn. 06712

Division of Ser. No. 693,273, Jan. 22, 1985, Pat. No. 4,603,432.
This application Jun. 9, 1986, Ser. No. 871,908
Int. Cl.[4] B65B *11/58*
U.S. Cl. 53—449 8 Claims



6. In a method for containing a liquid spill from a vessel having a leak through which liquid is escaping, the steps comprising:

(a) providing a leak-proof, flexible spill containment bag of fluid-impervious material forming an enclosure and including a main body portion and an extension portion with an opening at the top thereof and closure means therabout, said extension portion being folded into said main body portion, each of said main body portion and extension portion having lifting means about the outer periphery thereof; and

(b) unfolding said extension portion into a position extending beyond said main body portion; and

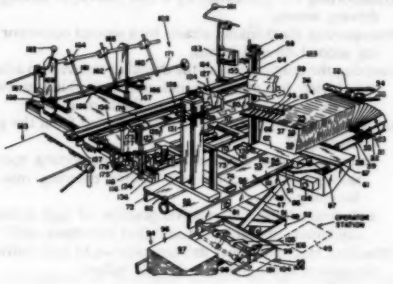
(c) coupling said spill containment bag to the leaking vessel with said opening in said bag disposed about the point of the leak whereby the liquid flows through said opening and into said enclosure.

4,707,970

APPARATUS FOR PACKAGING BOX FLATS

Raymond A. Labombarde, Nashua, and Robert A. Tremblay, Hollis, both of N.H., assignors to International Paper Box Machine Co., Nashua, N.H.

Continuation of Ser. No. 583,640, Feb. 27, 1984, abandoned.
This application Jun. 10, 1986, Ser. No. 872,559
Int. Cl.[4] B65B *63/02*
U.S. Cl. 53—529 9 Claims



8. Apparatus operable by a single operator from a single location at one side of a slug compression and inspection table, for individually and successively packing a plurality of counted slugs of flat, folded cartons, being delivered at high speed along a longitudinal path in shingled formation on a stacker apron, into packing cases, said apparatus comprising:

means for supplying a plurality of counted, compressed, slugs of said flats individually and successively onto said table, compressing each slug, and pushing each slug individually and successively laterally off the other side of said table opposite to the said one side;

case turning means, on the said other side of said table, said means including case gripper means, sometimes poised at a level above the level of said table, for slidably receiving an erected, open, tubular case inserted therein by said operator, the case resting on a side wall with its top opening facing said operator, its bottom minor flaps held closed by a support tongue and its said side wall resting on pivotable turning forks;

and sequence control mechanism including power mechanism actuated by a start button within reach of said operator, for lowering said case gripper to the level of said table for slidably receiving a compressed, inspected counted slug of said flats pushed laterally across said table, then pivoting said turning forks through an angle of about 90° to rest the case on said support tongue, then upfolding the bottom major flaps against the under face of said tongue and down folding the minor top flaps of each case while

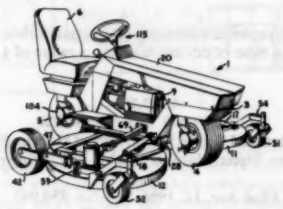
pushing the case along the tongue in the direction of discharge to a box taper.

4,707,971

SLOPE MOWER

Raye E. Forpahl; Dewey L. Hostetler, and Delmar G. Hostetler, all of Harper, Kans., assignors to DewEze Manufacturing, Inc., Harper, Kans.

Filed Apr. 21, 1986, Ser. No. 854,102
Int. Cl.[4] A01D *34/06, 34/44;* B60R *21/00*
U.S. Cl. 56—6 **20 Claims**



1. A mower vehicle for mowing slopes comprising:
(a) a mower vehicle frame having a generally vertical orientation, when in operation;
(b) single front wheel means and single rear wheel means, each of said wheel means being connected to said frame and generally aligned such that said frame is pivotal relative to the ground about a longitudinal line passing through the bottom of both said front and rear wheel means;
(c) a prime mover mounted on said frame and connected to at least one of said front wheel means and rear wheel means for movement of said mower vehicle across the ground;
(d) a blade housing pivotally connected to said frame and swingable about an axis extending longitudinally of said frame; said blade housing extending laterally from said longitudinal axis and having a ground engageable outrigger wheel laterally spaced from said frame;
(e) cutting means mounted in said blade housing; and
(f) pivoting means for pivoting said blade housing about said longitudinal axis in automatic response to a change in terrain thereby allowing said blade housing to follow the terrain while said frame pivots about the terrain on said front and rear wheel means and remains in the vertical orientation thereof.

4,707,972

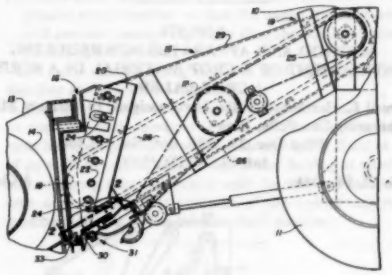
MOVABLE FEEDER FLOOR FOR COMBINES

Larimer J. Knepper, New Holland, Pa., assignor to New Holland Inc., New Holland, Pa.

Filed Jun. 19, 1985, Ser. No. 746,606
Int. Cl.[4] A01F *12/10*
U.S. Cl. 56—10.2 **10 Claims**

1. In a combine harvester having a base unit supported by a mobile frame; a feederhouse supported from said mobile frame and having a forwardly spaced inlet end and a discharge end in flow communication with said base unit to feed crop material thereto for harvesting treatment, said feederhouse being formed as a hollow conduit with a floor and upright walls, said feederhouse having a crop elevator mounted therewithin to be cooperable with said floor to convey crop material from said inlet end to said discharge end; and a face plate movably mounted on the inlet end of said feederhouse for a detachable connection to a crop gathering header, said face plate being movable in a fore-and-aft direction to change the angle of the crop gathering header relative to the ground, the improvement comprising:

a floor extension member pivotally connected to said face plate at a position adjacent said crop harvesting header and extending rearwardly therefrom to said feederhouse floor for a slidable engagement therewith in a telescopic manner, said floor extension member being movable in



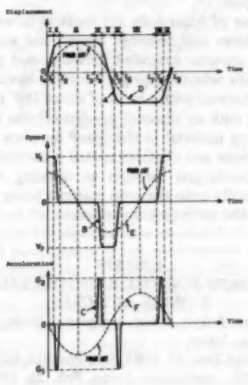
said fore-and-aft direction with said face plate and being operable upon movement of said face plate to span the variable distance between said crop harvesting header and said feederhouse floor.

4,707,973

METHOD FOR HARVESTING FRUIT, BERRIES AND THE LIKE, IN PARTICULAR FOR GATHERING GRAPES IN WHOLE BUNCHES

Alain Deux, Angers; Jean-Camille Merant, Doue la Fontaine; Francois Gibert, Civens, and Antoine Berger, la Rochelle la Moliere, all of France, assignors to Braud, Société Anonyme and Tecmachine, Société Anonyme, both of, France

Filed Apr. 24, 1986, Ser. No. 855,456
Claims priority, application France, Apr. 30, 1985, 85 06544
Int. Cl.[4] A01D *46/28*
U.S. Cl. 56—328 R **8 Claims**



1. A method for harvesting fruits, berries and the like, in particular for gathering grapes in whole bunches, comprising: shaking a plant bearing said fruits, berries and the like by means of shaker members which encompass the plant, by reciprocating the shaker members between two end positions on each side of a mean position, and by subjecting the shaker members at least on one side of said mean position to a succession of motion stages, said motion stages comprising a high-speed motion stage, a practically zero-speed motion stage in at least one of the two end positions of the shaker members and, between said two motion stages, an intermediate motion stage

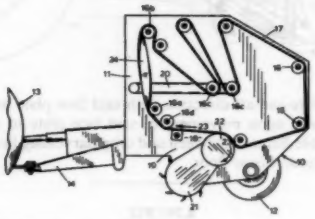
having a high speed gradient, the speed in the high-speed motion stage being at least equal to 2 meters per second, the duration of the practically zero speed stage being at least equal to 30 milliseconds and the speed gradient in the intermediate stage being at least equal to 200 meters per square second.

4,707,974

METHOD AND APPARATUS FOR REDUCING ENTRAPMENT OF A CROP MATERIAL IN A ROUND CROP BALER

Carroll L. Harthoorn, Pella, Iowa, assignor to Vermeer Manufacturing Co., Pella, Iowa

Filed Dec. 23, 1985, Ser. No. 812,460
Int. Cl.[4] A01D *39/00*
U.S. Cl. 56—341 **3 Claims**



1. In a round baler machine including:
(1) a pair of upright transversely spaced side walls,
(2) a plurality of rolls supported by said side walls including a pair of vertically spaced front rolls,
(3) a plurality of transversely spaced flat belts supported by said rolls having bale engaging sections which define an expandable bale forming chamber means having a crop material inlet, and
(4) a crop material pick up means below said pair of front rolls for feeding crop material into said inlet; the improvement wherein:
(a) said pair of front rolls are located forwardly of and spaced from said chamber means, and said belts have upright sections extended between said pair of front rolls, with selected upright sections having a portion thereof formed with a twist of about 180° to provide an opening with an adjacent upright section whereby any stray crop material in the space between said upright belt sections and chamber means is carried by the belts to be discharged through an opening and dropped downwardly onto the crop material being fed into said inlet by the crop pick up means.

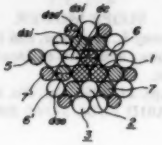
4,707,975

STEEL CORDS FOR THE REINFORCEMENT OF RUBBER ARTICLES

Yujiro Umezawa, Tokyo, Japan, assignor to Bridgestone Corporation, Tokyo, Japan

Filed Dec. 18, 1985, Ser. No. 810,460
Claims priority, application Japan, Feb. 26, 1985, 60-35215; Feb. 26, 1985, 60-35216
Int. Cl.[4] D07B *1/06*
U.S. Cl. 57—212 **11 Claims**

1. In a steel cord for the reinforcement of rubber articles comprising a central base structure composed of 2 to 4 steel filaments, and at least one coaxial layer composed of plural steel filaments arranged around the central base structure, the steel filaments of the coaxial layer and the central base structure being twisted in the same direction at the same pitch, the improvement wherein the steel filaments constituting the central base structure have the same diameter (dc), while a steel filament in the coaxial layer which contacts with the adjoining steel filaments of said central base structure has a diameter (dsi) equal to the diameter (dc) and the remaining steel filaments in



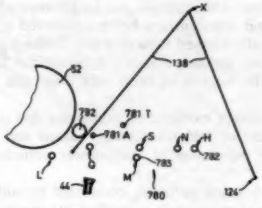
the coaxial layer have a diameter (dso) smaller than the diameter (dc) and a ratio of dc/dso is within a range of 1.03 to 1.25.

4,707,976

OPEN END YARN PIECER

Werner Graber, and Walter Slavik, both of Horgen, Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Apr. 11, 1986, Ser. No. 850,949
Claims priority, application United Kingdom, Apr. 29, 1985, 8510842
Int. Cl.[4] D01H *15/02*
U.S. Cl. 57—263 **10 Claims**



1. In combination,
a first yarn clamp for engaging a length of yarn for a piecing operation;
a second yarn clamp for engaging the length of yarn and being movable between a first position and a second position;
means at said first position to create a prepared yarn end in a yarn held in said second yarn clamp thereat for piecing; and
a plurality of relatively movable guide elements between said clamps for defining a yarn path of controllably variable form and length, one of said guide elements being movable into a position to permit backfeeding of the yarn end to a predetermined position following release of the yarn end from said second yarn clamp and a second of said guide elements comprising a releasable yarn retainer for releaseing a yarn from said path to permit free movement of the yarn end from said predetermined position.

4,707,977

COMPOSITE CORD MANUFACTURING METHOD

Jean-Claude Cousin, Wervicoq Sud, and Jacques A. Robin, Paris, both of France, assignors to Cousin Freres, Wervicoq Sud, France

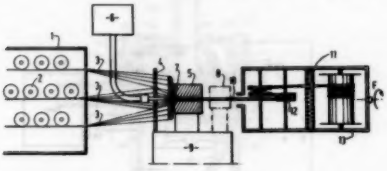
Continuation-in-part of Ser. No. 600,309, Apr. 13, 1984, abandoned. This application May 12, 1986, Ser. No. 862,030
Claims priority, application France, Apr. 14, 1983, 83 06084
Int. Cl.[4] D02G *3/40*
U.S. Cl. 57—297 **4 Claims**

1. A method of manufacturing a composite cord, particularly for tennis rackets, from two different components consti-

tuted solely of thermoplastic material, each of the components having a ratio in weight comprised between 45 and 55% of the total weight, the first component being constituted of textile multifilament synthetic yarns and the second component being a thermoplastic binder the softening point of which is lower than the softening point of the first component comprising:

passing the first component through a die

heating the second component to a semiliquid state and then



introducing it under pressure into the yarns in the die to impregnate the yarns before they are twisted together,

twisting the yarns under tension by a rotational movement of a take-up spool to flow the second component into surrounding relationship with said yarns,

compressing the assembly of the first and second components in the die, and then

cooling the composite cord to return it to ambient temperature and roll it on a

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4,707,978

FLOW ENERGY CONVERSION MACHINE

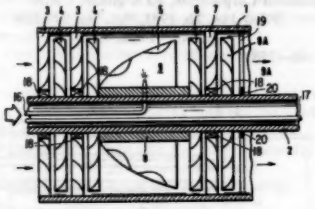
Felix García Cascajosa, Madrid, Spain, assignor to Latimer N.V., Curacao, Netherlands Antilles

Continuation of Ser. No. 757,734, Jul. 22, 1985, abandoned. This application Feb. 17, 1987, Ser. No. 16,501

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1984, 3432683

Int. Cl.[4] F02C *3/16*

U.S. Cl. 60—39.35 **4 Claims**



1. A flow engine through which gases flow in one direction from an inlet at one end of the engine to an outlet at the other end thereof, said engine having a substantially circular cross-section transverse to said one direction and having stationary guide blades arranged in said cross-section in at least one plane which is normal to said one direction and rotor blades which are rotatably arranged in at least one plane parallel to the plane of said stationary guide blades, said engine being characterized by:

A. a tubular shaft member which

(1) is coaxial to said cross-section,

(2) extends in said one direction through at least the distance between said inlet and said outlet, and

(3) has a diameter which is uniform along substantially its entire length;

B. said stationary guide blades being fixed to the exterior of said tubular shaft member;

C. a cylindrical rotor member disposed in relatively rotatable coaxially surrounding relationship to said tubular shaft member to cooperate therewith in defining an annular passage between said members, the inside diameter of said rotor member being

(1) uniform along substantially the entire length thereof and

(2) sufficiently larger than the outside diameter of said tubular shaft member so that the radial distance across said annular passage is greater than the outside diameter of said shaft member;

D. said rotor blades being fixed to said cylindrical rotor member at the interior thereof; and

E. a plurality of struts extending radially across said passage to maintain said members in said relationship, each said strut having a pair of opposite ends and being fixed at one of its ends to one of said members and having at its other end a bearing that connects it with the other of said members and provides for rotation of the cylindrical rotor member relative to the tubular shaft member.

4,707,979

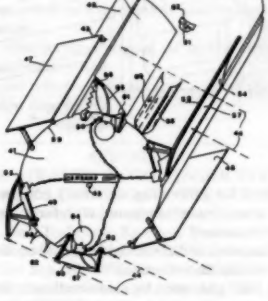
METHOD FOR STORING AND RE-RADIATING ENERGY TO PROVIDE PROPULSION FORCES ON DEVICES

Gunter E. Gutsche, 4476 Forget, St. Louis de Terrebonne, Quebec, Canada

Continuation-in-part of Ser. No. 471,306, Mar. 2, 1983, abandoned. This application Jul. 29, 1985, Ser. No. 760,087

Int. Cl.[4] F02C *11/00*

U.S. Cl. 60—203.1 **12 Claims**



1. A method for providing, controlling and utilizing thrust forces in a selected direction on an object having an axis of rotation and positionable in an environment having at least some free particles and a temperature difference with said object, said environment containing at least one source of radiant energy, said object comprising at least one absorbent surface portion having the capacity to absorb said radiant energy, to convert said radiant energy to storable or latent energy, to store said storable or latent energy and to release said storable or latent energy, the improvement comprising the steps of:

(a) selecting the direction of the required thrust forces to be provided on said object,

(b) determining from the position of said source of radiation, said temperature difference and said capacity to absorb, the direction and speed of rotation of said surface portion required to move said surface portion exposed to said radiant energy toward a direction pointing away from the direction of the required thrust forces, so that the resultant of the forces from the potential release of said storable or latent energy substantially coincides with the said direction of the required thrust forces,

(c) causing the rotation of said surface portion by bringing a force to bear on said surface portion in a selected direction and strength so as to move said surface portion facing said radiant energy in a receding movement with respect to the direction of said radiant energy and toward the direction opposite to the direction of the required thrust forces,

(d) providing said thrust forces by causing said surface portion to release said storable or latent energy as radiation into said environment in a direction substantially opposite to the direction of the required thrust forces and by creating radiation pressure against said object in reaction to the release of the said radiation,

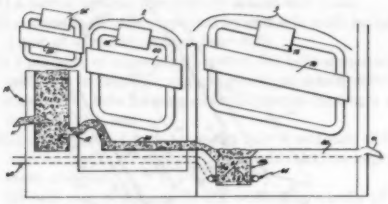
(e) providing said thrust forces by causing said surface portion to release said storable or latent energy by energizing and repelling said free particles adjacent said surface portion in a direction substantially opposite to the direction of the required thrust forces and by creating a reaction force against said object by the repelling of said free particles.

4,707,980

POWER PRODUCTION PROCESS THAT REDUCES ACID RAIN

Samuel Wabeke, deceased, late of Wyoming, Mich. (by Hilda Wabeke, heir), assignor to James A. Wabeke et al., Grand Rapids, Mich.

Filed Mar. 13, 1985, Ser. No. 711,286
Int. Cl.[4] C06D *5/00*
U.S. Cl. 60—206 **15 Claims**



1. A method for generating electricity comprising:

initiating a reaction of aluminum with ferric oxide in a combustion chamber;

adding aluminum and ferric oxide to said combustion chamber to sustain said reaction;

using the heat generated by said reaction to fire a boiler;

using the gas generated in the boiler to operably drive an electrical generator, whereby the molten iron resulting from the reaction will sink to the bottom of said combustion chamber, the aluminum oxide resulting from the reaction will float on top of the iron in an intermediate layer and the added iron oxide and aluminum will tend to react on top of aluminum oxide, and drawing molten iron from said combustion chamber an converting said iron to oxide form.

4,707,981

VARIABLE EXPANSION RATIO REACTION ENGINE

William R. Wagner, Los Angeles, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 27, 1986, Ser. No. 822,442
Int. Cl.[4] F02K *1/30*
U.S. Cl. 60—242 **6 Claims**

1. A variable expansion ratio reaction rocket engine for producing a mainstrean of hot combustion gases comprising:

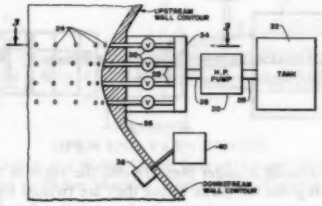
a reaction chamber including a thrust nozzle portion formed by converging and diverging wall portions in which the diverging portion terminates in a gas discharge and through which the combustion gases pass;

a nozzle throat section at the juncture of the convergent-divergent wall portions;

rows of circumferentially and axially spaced injection ports formed within the wall portions and communicating therethrough and into the reaction chamber;

a plurlity of fluid conduit means in communication with the injection ports;

at least one high pressure pump in communication with the plurality of fluid conduit means;



a fluid containing storage tank including a conduit in communication with the high pressure pump; and

means for selectively controlling a flow of fluid out of the tank, through the pump and to the fluid conduit means and the injection ports for controllng a cross-sectional area of the mainstream combustion gases passing through the thrust nozzle according to the relationship

$$\frac{w_{inj}}{w_{main}} = \frac{\rho_w V_w \pi D^* L}{\rho_g {}^* V_g {}^* \pi D^{*2}} = \frac{4\rho_w V_w L}{\pi \rho_g {}^* V_g {}^* D^*}$$

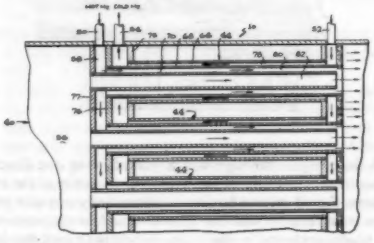
thereby optimizing an expansion ratio within the chamber.

4,707,982

THERMAL REGENERATIVE INJECTOR

William R. Wagner, Los Angeles, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jun. 26, 1981, Ser. No. 277,520
Int. Cl.[4] F02K *9/00*
U.S. Cl. 60—258 **14 Claims**



1. An apparatus for injecting fuel and oxidizer into the combustion zone of an engine, comprising:

a housing;

means for receiving said fuel within said housing;

means for preheating said fuel within said housing;

a heat source external to said apparatus;

means for transporting said fuel from said housing to said heat source wherein said fuel is heated;

means for receiving said heated fuel within said housing;

means for receiving said oxidizer within said housing; and

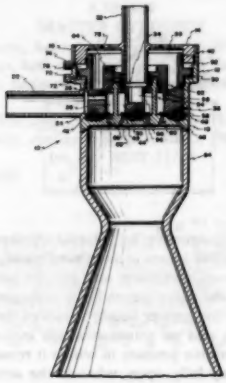
means for injecting said oxidizer and said heated fuel from said housing into said combustion zone, said injection means being integral with said housing.

4,707,983

FLEXURE DISC SEALED INTEGRAL BIPROPELLANT VALVE AND INJECTOR VALVE ASSEMBLY

Willard A. Gillon, Jr., Canoga Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 24, 1986, Ser. No. 934,364
Int. Cl.[4] F02K *9/00, 9/42, 9/72*
U.S. Cl. 60—258 18 Claims



10. A valve assembly for controllably injecting propellants into a combustion chamber of a fluid-fueled rocket engine, comprising:

a valve assembly housing structure including means for sealably interfacing the valve assembly and a rocket engine combustion chamber;

a core formed by the valve assembly housing;

a piston assembly;

external and internal manifolds formed within the piston assembly;

a first fluid inlet chamber;

a fluid inlet passageway formed within the piston assembly and communicating between the fluid inlet chamber and the external manifolds;

a second fluid inlet chamber formed medially of the piston assembly;

a fluid receptacle associated with the second fluid inlet;

a fluid inlet channel communicating between the fluid receptacle and the internal manifold;

means for introducing fluid into the valve assembly;

means for actuating the piston assembly; and

means for ejecting fluid from the valve assembly.

4,707,984

DOUBLE AIR-FUEL RATIO SENSOR SYSTEM HAVING IMPROVED RESPONSE CHARACTERISTICS

Toshiyasu Katsuno; Toshinari Nagai, both of Susono; Takatoshi Masui, and Yasushi Satou, both of Mishima, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Apr. 11, 1986, Ser. No. 850,619
Claims priority, application Japan, Apr. 15, 1985, 60-78528; Jun. 13, 1985, 60-127119; Jun. 17, 1985, 60-129905
Int. Cl.[4] F02D *41/14*
U.S. Cl. 60—274 38 Claims

1. A method for controlling the air-fuel ratio in an internal combustion engine having a catalyst converter for removing pollutants in the exhaust gas thereof, and upstream-side and downstream, respectively, of said catalyst converter for detecting the concentration of a specific component in the exhaust gas, comprising the steps of:

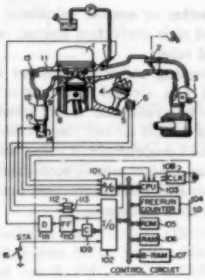
adjusting an actual air-fuel ratio in accordance with the outputs of said upstream-side and downstream-side air-fuel ratio sensors;

detecting a coolant temperature of said engine

prohibing the adjustment of said actual air-fuel ratio by the output of said downstream-side air-fuel ratio sensor in accordance with the detected coolant temperature, wherein said adjustment prohibiting step comprises the steps of:

determining whether or not said engine is started;

calculating a reference duration in accordance with the coolant temperature detected immediately after said engine is started or after a predetermined time period has passed after said engine is started;



calculating a duration after said engine is started; and

determining whether or not said duration is smaller than said reference duration,

thereby prohibiting the adjustment of said actual air-fuel ratio sensor when said duration is smaller than said reference duration;

detecting a deterioration degree of said downstream-side air-fuel ratio sensor; and

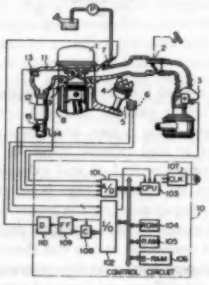
correcting said reference duration in accordance with said deterioration degree.

4,707,985

DOUBLE AIR-FUEL RATIO SENSOR SYSTEM CARRYING OUT LEARNING CONTROL OPERATION

Toshinari Nagai, Susono; Takatoshi Masui; Yasushi Sato, both of Mishima, and Toshiyasu Katsuno, Susono, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Sep. 10, 1986, Ser. No. 905,514
Claims priority, application Japan, Sep. 12, 1985, 60-200488; Aug. 27, 1986, 61-199119
Int. Cl.[4] F02D *41/14*
U.S. Cl. 60—274 48 Claims



1. A method for controlling an air-fuel ratio in an internal combustion engine having a catalyst converter for removing

pollutants in the exhaust gas thereof, and upstream-side and downstream-side air-fuel ratio sensors disposed upstream and downstream, respectively, of said catalyst converter, for detecting a concentration of a specific component in the exhaust gas, comprising the steps of:

calculating a first air-fuel ratio correction amount in accordance with the output of said upstream-side air-fuel ratio sensor;

calculating a second air-fuel ratio correction amount in accordance with the output of said downstream-side air-fuel ratio sensor;

calculating a change of said second air-fuel ratio correction amount;

determining whether or not the calculated change of said second air-fuel ratio correction amount is smaller than a predetermined value;

calculating a learning correction amount so that a mean value of said first air-fuel ratio correction amount is brought close to a reference value, when the calculated change of said second air-fuel ratio correction amount is smaller than said predetermined value; and

adjusting an actual air-fuel ratio in accordance with said first and second air-fuel ratio correction amounts, and said learning correction amount.

4,707,986

EXHAUST SYSTEM FOR WATER CRAFT ENGINES

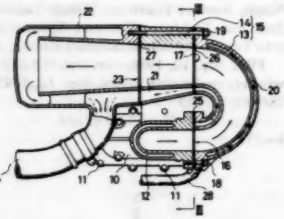
Toshiyuki Takada, Miki; Noboru Fukui, Kakogawa, and Akihito Shimizu, Kobe, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Filed Oct. 3, 1986, Ser. No. 914,949

Claims priority, application Japan, Oct. 8, 1985, 60-224172

Int. Cl.⁴ F01N *7/10*

U.S. Cl. 60—310 **2 Claims**



1. In an exhaust system for water craft engines, said exhaust system consisting of an exhaust manifold connected to the cylinder exhaust port of the engine, an exhaust pipe connected at one end thereof to said exhaust manifold, and a diffuser connected to the opposite end of said exhaust pipe, the improvement wherein said exhaust pipe is divided into a first vertical, largely U-shaped pipe portion immediately connected at one end thereof to said exhaust manifold and a second horizontal pipe portion connected at one end thereof to the opposite end of said first pipe portion at downstream thereof and at the other end to said diffuser, said second pipe portion being mounted to extend adjacent to said exhaust manifold and made integral with the opposed external surface of said exhaust manifold.

4,707,987

EXHAUST SYSTEM FOR INTERNAL COMBUSTION ENGINE

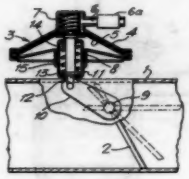
Graham E. Atkin, 2 Harmer La., Cringleford, United Kingdom

Filed Oct. 9, 1985, Ser. No. 785,759

Claims priority, application United Kingdom, Oct. 10, 1984, 8425657

Int. Cl.⁴ F01N *7/00*

U.S. Cl. 60—324 **7 Claims**



1. An exhaust system for an internal combustion engine which comprises valve means in an exhaust passageway which in an operative position restricts said exhaust passageway by varying amounts, the valve means being arranged so that the opening is greater for greater steady values of the pressure of the exhaust gases, and an actuator which moves the valve means to an inoperative position in which it remains with the exhaust passageway fully open, wherein the actuator moves the valve means to an operative position in response to the depression of the engine induction system, and including a delay valve for delaying the movement of the valve means to its inoperative position in response to removal of the depression of the engine induction system.

4,707,988

DEVICE IN HYDRAULICALLY DRIVEN MACHINES

Göran Palmers, Hällstamsvägen 35, S-436 00 Askim, Sweden

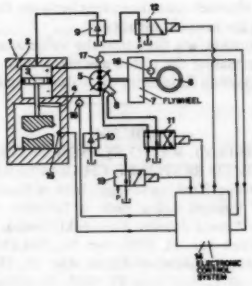
PCT No. PCT/SE84/00032, § 371 Date Oct. 3, 1984, § 102(e) Date Oct. 3, 1984, PCT Pub. No. WO84/03127, PCT Pub. Date Aug. 16, 1984

PCT Filed Feb. 2, 1984, Ser. No. 662,407

Claims priority, application Sweden, Feb. 3, 1983, 83000567

Int. Cl.⁴ F16D *31/02*

U.S. Cl. 60—413 **2 Claims**



1. An energy recovery device for machines operated by variable fluid pressure such as hydraulic presses which are driven by a hydraulic piston and cylinder means, said device further comprising:

at least one hydraulic pump/motor unit for the hydraulic fluid;

a motor for driving the pump;

a flywheel energy accumulator associated with said motor;

an adjustment device for switching said pump/motor unit in

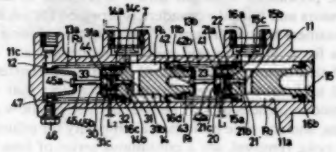
relation to the position of the hydraulic piston after a full working cycle from pumping work to motor work at unchanged direction of rotation, so that the unit, at least during the beginning of the decompression phase of the machine, works as a motor which via the pressurized oil in the hydraulic system brings back the elastically stored energy in the machine to the flywheel.

4,707,989

MASTER CYLINDER

Kaoru Nakamura, Anjo; Shinji Sakata, Nishio; Chiaki Ochiai; Yoichi Furuta, both of Chiryu, and Kaoru Tsubouchi, Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jun. 26, 1986, Ser. No. 878,662
Claims priority, application Japan, Jul. 2, 1985, 60-100857[U]
Int. Cl.[4] B60T *11/28*
U.S. Cl. 60—589 **6 Claims**



1. A master cylinder for a hydraulic brake system comprising:

a housing having an axial bore, at least one piston fitted in said bore slidably in a liquid-tight fashion and defining in said bore a pressure chamber normally in fluid communication with a brake pipe and a fluid supply chamber normally in fluid communication with an oil reservoir, said piston having at one end thereof an axial recess facing said pressure chamber and having a bottom defining a valve seat, a valve member fitted in said recess movable axially of said piston away from, or into, contact with said valve seat for making or breaking fluid communication between said pressure chamber and said oil reservoir, a spring retainer fitted about said one end of said piston, a first compression spring held in said recess by said spring retainer for urging said valve member toward said valve seat, a supporting member provided in said bore on the opposite side of said pressure chamber from said piston, a connecting rod connected to said valve member and extending through said spring retainer and said supporting member and movably axially of said piston, and a second compression spring provided between said spring retainer and said supporting member for urging them away from each other to cause said connecting rod to engage said spring retainer and said supporting member to thereby move said valve member away from said valve seat, wherein said spring retainer is movable in normal operation axially by a certain distance relative to said piston so as to increase the distance between said valve member and said valve seat and to allow release of any residual fluid in the pressure chamber and wherein said supporting member is fixed to said housing.

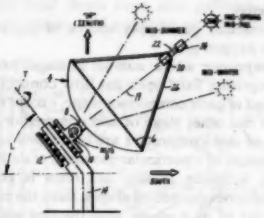
4,707,990

SOLAR POWERED STIRLING ENGINE

Roelf J. Meijer, Ann Arbor, Mich., assignor to Stirling Thermal Motors, Inc., Ann Arbor, Mich.

Filed Feb. 27, 1987, Ser. No. 19,651
Int. Cl.[4] F03G *7/02*
U.S. Cl. 60—641.15 **9 Claims**

1. In a solar dish module which comprises a dish which receives incident solar rays and reflects them to a focus at which is located the combination of a receiver and a heat engine organized and arranged so that the heat energy of the reflected solar rays collected at the receiver powers the engine, and wherein the receiver and heat engine are supported from the dish by a framework, the improvement which comprises



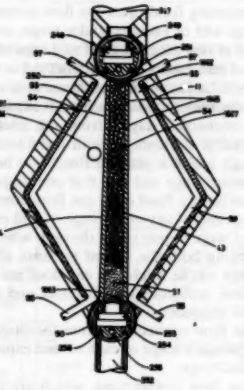
journal means for journaling at least the engine on the framework to maintain certain predetermined spatial orientation for the engine in relation to the direction of gravity irrespective of spatial orientation of the dish.

4,707,991

MULTIPLE REACTOR CYCLIC VELOX BOILER PLANT

Joseph C. Firey, P.O. Box 15514, Seattle, Wash. 98115-0514

Filed Apr. 8, 1987, Ser. No. 35,895
Int. Cl.[4] F01K *13/00*
U.S. Cl. 60—670 **8 Claims**



1. The combination of a cyclic velox boiler plant comprising:

a cyclic oxidation char gasifier plant comprising:

at least one compressor means for compressing gases from a lower pressure to a higher pressure and each such compressor means comprising at least one stage and each such stage comprising an inlet and an outlet end;

at least one expander means for expanding gas from a higher pressure to a lower pressure and each such expander means comprising at least one stage and each such stage comprising an inlet end and a discharge end;

at least two separate containers, each of said containers comprising pressure vessel means for containing char fuel and any gas compressed into said char fuel, each such container comprising interior surfaces on the combustion side;

power means for driving said compressors and for absorbing any mechanical work done upon said expanders by said expanding gas;

each such expander means comprising an expander discharge;

at least one char fuel heater, said char fuel heater comprising means for heating a portion of the char fuel within each of said containing means to that temperature at which said char will react rapidly with oxygen in adjacent compressed reactant gases when said cyclic char gasifier plant is being started;

at least one reactant gas supply source of gas containing appreciable oxygen gas;

each such compressor whose number of stages exceeds one further comprising fixed open gas flow connections from the outlet end of each compressor stage, except one, to the inlet end of one other stage of said compressor, whereby said stages of said compressor are connected in series so that the pressure of a particular gas mass, at delivery from each stage, increases as said gas mass is compressed through said series connected stages, from the inlet end to the outlet end of each stage, with the first stage in said series through which a gas mass first flows being both the lowest pressure stage and also that one stage whose inlet end does not have a fixed open gas flow connection from the outlet end of any other stage of said compressor, and with the last stage in said series through which a gas mass last flows being both the highest pressure stage and also that one stage whose outlet end does not have a fixed open gas flow connection to the supply end of any other stage of said compressor;

fixed open gas flow connections from the inlet end of the lowest pressure stage of each of said compressors to at least one reactant gas supply source of gas containing appreciable oxygen gas;

each such expander whose number of stages exceeds one further comprising fixed open gas flow connections from the discharge end of each expander stage, except one, to the inlet end of one other stage of said expander, whereby said stages of said expander are connected in series so that the pressure of a particular gas mass, at discharge from each stage, decreases as said gas mass is expanded through said series connected stages, from the inlet end to the discharge end of each stage, with the first stage in said series through which a gas mass first flows being both the highest pressure stage and also that one stage whose inlet end does not have a fixed open gas flow connection from the discharge end of any other stage of said expander, and with the last stage in said series through which a gas mass last flows being both the lowest pressure stage and also that one stage whose discharge end does not have a fixed open gas flow connection to the inlet end of any other stage of said expander;

fixed open gas flow connections from the discharge end of the lowest pressure stage of each of said expanders to said expander discharge;

changeable gas flow connections, which are openable and closeable, from each of said containers to each outlet end of each stage of each of said compressors and to each inlet end of each stage of each of said expanders;

each cyclic char gasifier plant comprising a number of said containers, with changeable gas flow connections to said compressors and to said expanders, at least equal to the sum of the number of compressor stages of all compressors, and the number of expander stages of all expanders;

at least one refuel mechanism, said refuel mechanism comprising;

means for transferring a volume of solid materials from a supply source into said containing means when said refuel transfer means is connected to said containing means; means for connecting said refuel transfer

means for connecting said refuel transfer means to said containing means for a time period for refueling and for disconnecting said refuel transfer means from said containing means at the end of said refuel time period;

means for sealing said refuel means for connecting and disconnecting against gas leakage;

at least one coke removal mechanism, said coke removal mechanism comprising;

means for transferring a volume of non-gas materials out of said containing means;

means for opening and closing said changeable gas flow connections so that each container is opened for a time period to each outlet end of each stage of each of said compressors, in a sub-sequence of time periods of open gas flow connections to compressors, said subsequence proceeding in time order of increasing compressor stage delivery pressure, and is opened for a time period to each inlet end of each stage of each of said expanders, in a sub-sequence of time periods of open gas flow connections to expanders, said sub-sequence proceeding in time order of decreasing expander stage inlet pressure, said subsequence of connections to said compressors being followed by said sub-sequence of connections to said expanders, and these together comprise one sequence of time periods of open gas flow connections, each of said containers is opened to only one stage during any one time period of said sequence of time periods, said sequence of time periods of open gas flow connections to said compressors and to said expanders is repeated for each of said containers by said means for opening and closing

means for controlling said means for opening and closing, and said means for connecting said refuel transfer means and said coke removal transfer means, so that said repeated sequences of time periods of open gas flow connections, and any time periods available only for refueling and for coke removal, are a continuous series of time periods for any one containing means, and so that the delivery end of each stage of each compressor has an open gas flow connection to one containing means, and the inlet end of each stage of each expander has an open gas flow connection to one containing means, during all time periods, whenever said plant is operating;

said cyclic velox boiler machine further comprising:

boiler means for heating and boiling liquid water at pressure and for heating steam at pressure, and comprising a boiler feedwater inlet and a boiler steam outlet, at least one portion of said boiler means comprising at least one radiant heater means positioned on the interior surfaces of one of said containers, each such radiant heater comprising a liquid water inlet and a water outlet;

a source of boiler feedwater;

feedwater pumping means for pumping liquid water into said boiler means from said feedwater supply source and comprising a drive means for driving said feedwater pump and a control means for controlling the flow rate of water pumped;

feedwater pump connecting means for connecting said feedwater pumping means to said boiler means and to said feedwater supply source so that liquid water is forced into said boiler liquid water inlet whenever said plant is operating;

sensor and control means for sensing the quantity of char fuel within each said container when said plant is operating and operative upon said means for connecting said refuel transfer means so that, when the volume of char fuel within any one container becomes less than a minimum set value, said refuel transfer means is connected to that container by said means for connecting said refuel means, and when the volume of char fuel within any one said container exceeds a maximum set value, said refuel transfer means is disconnected from that container by said means for connecting said refuel means;

wherein the improvement comprises adding thereto:

a number of inner reactor chambers equal to an integral multiple of the number of said containers, each said inner reactor chamber comprising, walls through which gases can readily flow and which can contain solid fuels placed inside said inner reactor chamber, an inlet, and an outlet;

means for fastening a number of said inner reactor chambers equal to said integral multiple inside each said container so that, said refuel transfer means connects only to said inner reactor inlets whenever said refuel transfer means is con-

nected to any one of said containers, said coke removal mechanism removes non-gas materials only from said inner reactor outlets;

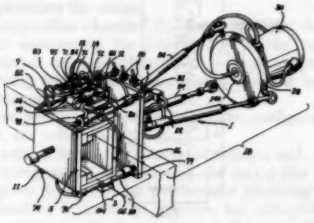
whereby said cyclic velox boiler plant becomes a multiple reactor cyclic velox boiler plant.

4,707,992

MICROWAVE RADIATING ANTENNAE HYDRAULIC ADJUSTMENT APPARATUS AND METHOD

Timothy R. Holm, 1739 E. Montebello, Phoenix, Ariz. 85016

Filed Oct. 9, 1985, Ser. No. 785,864
Int. Cl.[4] F15B *11/18*
U.S. Cl. 60—721 **9 Claims**



1. A hydraulic adjustment apparatus for use in adjusting and positioning microwave radiating antenna, comprising:

an upper portion suitable for slidably mounting onto a mounting member means;

a plurality of upper switch valve means integrally coupled to said upper portion for operably manipulating the axial distance between said upper portion from a lower portion of said hydraulic adjustment apparatus;

a plurality of upper adjustable leg member means for operably coupling to said upper switch valve means;

a plurality of lower adjustable leg member means coupled to said plurality of upper adjustable leg member means for adjusting desired positions of said lower portion of said hydraulic adjustment apparatus;

means for mounting one end of each of said plurality of upper adjustable leg member means and one end of each of said plurality of lower leg member means;

support means connected to another portion of each of said plurality of upper and lower leg member means for providing support thereof; and

a plurality of lower switch valve means integral to said lower portion for operably coupling to said plurality of lower adjustable leg member means.

4,707,993

PUMPING APPARATUS

James A. Kime, Columbus, Ohio, assignor to Hydro-Horse, Inc., Columbus, Ohio

Filed Nov. 24, 1980, Ser. No. 209,391
Int. Cl.[4] F16D *31/02*; F16H *39/46*
U.S. Cl. 60—372 **12 Claims**

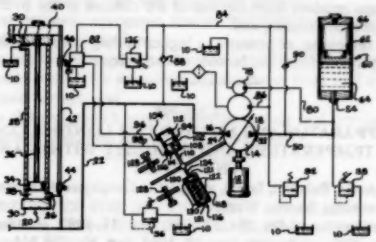
1. A reciprocating apparatus for use in pumping wells having well-head apparatus including a polish rod comprising, in combination:

precharged means for applying a precharge pressure to a fluid;

first pumping means for pumping the fluid and adding a cumulative pressure to and above the precharge presure in communication with said precharge means;

cylinder means in communication with said pumping means for receiving a working presure which includes the precharge pressure applied by said precharge means and the cumulative pressure applied by said pumping means, said cylinder means being adapted to operatively connect with the polish rod supporting a mass withn the well, whereby such working pressure applies a working force to said cylinder means to move th polish rod supporting the mass;

pilot means for reversing the fluid flow away from said cylinder means to said precharge means, the mass applying a recharging pressure to the reversed fluid as the reversed fluid flows from said cylinder means to said pumping means, said pumping means applying a second



cumulative pressure to said recharging pressure, whereby said precharge means receives a pressure which includes said recharging pressure said second cumulative pressure; and,

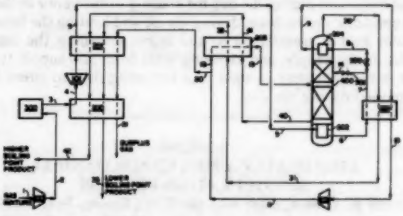
said pilot means including second pump means operatively connected to said first pumping means for substantially eliminating any unexpected cavitation of said first pumping means.

4,707,994

GAS SEPARATION PROCESS WITH SINGLE DISTILLATION COLUMN

Thirthahalli A. Shenoy, Whitehall, and Keith B. Wilson, Allentown, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Mar. 10, 1986, Ser. No. 838,233
Int. Cl.[4] F25J *3/00*
U.S. Cl. 62—11 **18 Claims**



1. A process for cryogenic separation of substantially pure, pressurized, constituent gas products from a gas mixture in a single pressure distillation column which comprises the steps of:

(a) providing a compressed gas feed stream;

(b) removing impurities that would freeze at cryogenic temperatures from the gas feed stream;

(c) cooling the gas feed stream;

(d) expanding and further cooling the gas feed stream in a turbine to produce work;

(e) heat exchanging the gas feed stream with the liquid phase of the bottom of the column to at least partially condense the gas feed stream and reboil at least part of the liquid;

(f) splitting the feed gas stream into two substreams;

(g) expanding the first substream and feeding it to the distillation column primarily in the liquid phase;

(h) expanding the second substream to a lower pressure and heat exchanging the expanded gas feed stream against the

vapor phase of the top of the column to partially condense the vapor phase and to completely vaporize the gas feed stream thereby providing column reflux;

(i) cold compressing the second substream to above column operating pressure;

(j) introducing the second substream into an intermediate point of the column;

(k) removing, at pressure, a lower boiling point constituent gas product from the top of the column as the overhead product stream; and

(l) removing, at pressure, a higher boiling point constituent product from the bottom of the column.

4,707,995

APPARATUS AND METHOD FOR CONTROLLING TEMPERATURE AND HUMIDITY WITHIN AN ENCLOSURE

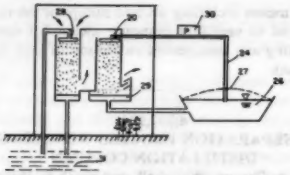
Gad Assaf, Rehovot, Israel, assignor to Geophysical Engineering Company, Seattle, Wash.

Continuation of Ser. No. 377,368, May 12, 1982, abandoned. This application May 28, 1985, Ser. No. 738,544

Claims priority, application Israel, Jun. 18, 1981, 63115

Int. Cl.⁴ F25D *17/06*

U.S. Cl. 62—94 **46 Claims**



1. A method for space heating an enclosure at night comprising the steps of: providing a source of water vapor inside said enclosure during the day; providing a supply of brine whose enthalpy is less than the enthalpy of the air in the enclosure during the day, and whose concentration is such that the brine is hygroscopic; exposing brine from said supply to the air in said enclosure during the day for causing water vapor in the air to condense on the brine drying the air and heating the brine as latent heat is transferred to the brine; returning the heated brine to the supply; and exposing brine from said supply to the air in the enclosure at night thus returning thereto latent heat removed during the day.

4,707,996

CHEMICALLY ASSISTED MECHANICAL REFRIGERATION PROCESS

Arnold R. Vobach, 6006 Allentown Dr., Spring, Tex. 77389

Continuation-in-part of Ser. No. 763,912, Aug. 8, 1985, abandoned, which is a continuation of Ser. No. 537,724, Sep. 29, 1983, abandoned, which is a continuation-in-part of Ser. No. 363,011, Mar. 29, 1982, abandoned. This application Feb. 13, 1986, Ser. No. 829,412

Int. Cl.⁴ F25B *1/00*

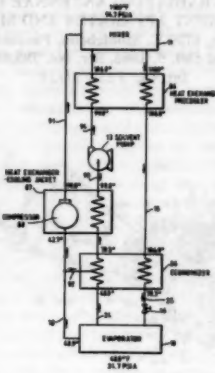
U.S. Cl. 62—114 **14 Claims**

1. A chemically assisted mechanical refrigeration process comprising the steps of:

mechanically comprising a refrigerant stream comprising vaporized refrigerant;

contacting the refrigerant with a solvent in a mixer at a pressure sufficient to promote substantial dissolving of the refrigerant in the solvent in the mixer to form a refrigerant-solvent solution while concurrently placing the solution in heat exchange relation with a working medium to transfer energy to the working medium, said refrigerant-solvent solution exhibiting a negative deviation from Raoult's Law;

reducing the pressure over the refrigerant-solvent-solution in an evaporator to allow the refrigerant to vaporize and substantially separate from the solvent while concurrently placing the evolving refrigerant-solvent solution in heat exchange relation with a working medium to remove energy from the working medium to thereby form a refrigerant stream and a solvent stream;



passing the solvent and refrigerant stream from the evaporator; and

placing the solvent stream leaving the evaporator in heat exchange relation in an economizing zone with the refrigerant-solvent solution leaving the mixer.

4,707,997

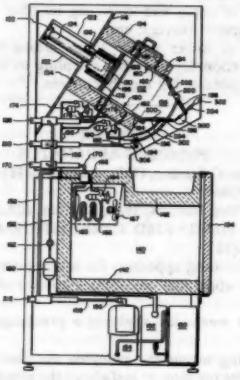
SYSTEM AND METHOD FOR DISPENSING FROZEN FOODS

Mont D. Bigler, 276 S. 600 East, Alpine, Utah 84003, and Jack L. Harsh, 3075 S. 500 East, South Salt Lake City, Utah 84106

Filed Jan. 27, 1986, Ser. No. 823,173

Int. Cl.⁴ F25C *5/14*

U.S. Cl. 62—341 **38 Claims**



29. A system for dispensing frozen foods comprising:

a tempering chamber for tempering a volume of frozen food;

a tempering chamber evaporator for adjusting and maintaining the frozen food in the tempering chamber at a predetermined tempering temperature;

a retention chamber for retaining a volume of frozen food;

a retention chamber flooded evaporator for adjusting and maintaining the frozen food retained in the retention chamber at a predetermined holding temperature;

at least one ram extendable into the retention chamber, each ram applying on demand intermittent pressure on the frozen food so as to be capable of incrementally moving the frozen food out of the retention chamber;

a configuration chamber for receiving the frozen food as the frozen food is moved out of the retention chamber, the configuration chamber having an approximately conical inner shape and an outlet near its apex, the configuration chamber inlcuding an inner wall defining a narrowing path to the frozen food as the frozen food is moved into the configuration chamber, the inner wall being oriented at a varying angle such that the path encountered by the frozen food is narrowed to a lesser extent as the inner wall approaches the outlet;

a configuration chamber flooded evaporator for adjusting and maintaining the frozen food in the configuration chamber at a predetermined serving temperature, the serving temperature being higher than the holding temperature;

a valve positioned at the outlet of the configuration chamber, the valve comprising:

a member formed in a scoop-like shape; and

pivoting means for allowing the scoop-like member to pivot from a filling position for receiving the frozen food to a discharge position, the scoop-like member partitioning the frozen food as the scoop-like member pivots to the discharge position and the frozen food is made available for serving when the scoop-like member reaches the discharge position.

4,707,998

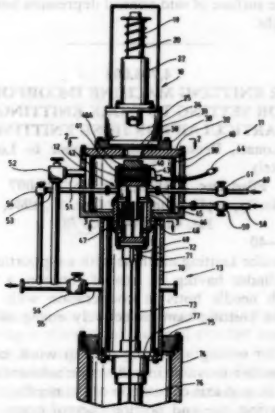
APPARATUS AND METHOD FOR ULTRARAPID COOLING OF BIOLOGICAL SAMPLES

John G. Linner, and Stephen Livesey, both of The Woodlands, Tex., assignors to The Board of Regents, The University of Texas, Austin, Tex.

Filed Dec. 3, 1986, Ser. No. 939,701

Int. Cl.[4] F25C *5/08*; F26B *13/30*

U.S. Cl. 62—349 **33 Claims**



1. Cryopreparation apparatus for the ultrarapid cooling of one or more biological samples without the formation of resolvable ice crystals in at least a portion of said one or more biological samples comprising:

(a) a housing, said housing enclosing a flat, mirror-finished, cryogenic surface, said cryogenic surface characterized by high heat conductivity at low temperatures;

(b) a sample delivery assembly, said assembly including a plunger mounted in a support structure, said plunger being moveable into and out of said housing, said support structure being cooperatively engaged to said housing said plunger being cooperatively aligned with said cryogenic surface such that said plunger's path of travel permits said plunger and one or more biological samples mounted thereon to penetrate into said housing and into a mated position with said cryogenic surface;

(c) an intrinsic cryogenic source functionally attached to said cryogenic surface;

(d) a regeneration system functionally attached to said cryogenic surface for removing contaminants from said cryogenic surface; and

(e) a thermal switch controllably insulating said cryogenic surface from said intrinsic cryogenic source.

4,707,999

RECEIVER FOR REFRIGERANT APPARATUS

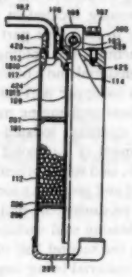
Hiromi Ohta, Kariya; Shinji Ogawa, Aichi; Yoshiharu Kajikawa, Hekinan; Keiichi Fukumura, Kariya; Kiyomitsu Tsuchiya, Okazaki; Kiyoshi Kittaka, Nukata, and Katsushi Narita, Nishio, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Feb. 21, 1986, Ser. No. 831,792

Claims priority, application Japan, Feb. 25, 1985, 60-35943; Apr. 22, 1985, 60-59929[U]; May 30, 1985, 60-81120[U]; Sep. 20, 1985, 60-144560[U]

Int. Cl.[4] F25B *43/00*

U.S. Cl. 62—474 **13 Claims**



1. Receiver means for coolant in a refrigerant circuit comprising:

a receiver housing having a top end portion provided with an inlet through hole, an outlet through hole, a first exterior threaded socket adjacent said inlet hole and a second exterior threaded socket adjacent said outlet hole;

a first block joint mounted exteriorly on said top portion and having a first through hole aligned with said first socket, and an inlet passage therethrough having one end thereof connected to said inlet hole and the other end thereof adapted to have one end of an inlet pipe connected thereto;

first screw means extending through said first through hole into threaded engagement in said first socket to detachably secure said first block joint to said top portion;

a second block joint mounted exteriorly on said top portion and having a second through hole aligned with said second socket, and an outlet passage therethrough having one end thereof connected to said outlet through hole and the other end thereof adapted to have one end of an outlet pipe connected thereto; and

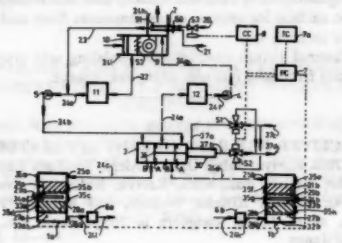
second screw means extending through said second through hole into threaded engagement in said second socket to detachably secure said second block joint to said top portion.

4,708,000

APPARATUS FOR BALANCED HEAT RECOVERY VENTILATION - HEATING - HUMIDIFICATION - DEHUMIDIFICATION - COOLING AND FILTRATION OF AIR

Ferdinand Besik, Mississauga, Canada, assignor to Canadian Gas Research Institute, Canada

Filed Mar. 13, 1987, Ser. No. 25,478
Int. Cl.[4] F25B *17/08*
U.S. Cl. 62—480 **18 Claims**



1. An apparatus for cyclic countercurrent transfer of heat and mass between two gaseous streams involving packed beds of a solid sorbent material and a solid heat exchanging material in a short operating cycle, said apparatus comprising:

two closed vessels, each being provided with at least one intake-exit opening located in the upper part and at least one intake-exit opening located in the lower part, each said vessel having in its lower part a built in horizontal support screen partition for holding said packed bed of said solid sorbent material and a built in horizontal support screen partition in its upper part for holding said packed bed of said solid heat exchanging material, and having at least two flanged openings located on its side wall provided for replacement of said solid sorbent and heat exchanging materials, said solid sorbent material providing a porous packed bed and removing sorbate from one of said two gaseous streams during the first half of the operating cycle and then releasing said sorbate into the other gaseous stream during the second half of the operating cycle, said solid sorbent material being any of the commercially available adsorbents, or an inexpensive porous solid material impregnated with a suitable commercially available adsorbent such as lithium chloride or lithium bromide, said solid heat exchanging material providing a porous packed bed and adsorbing heat from one of said two gaseous streams during said first half of the operating cycle and then releasing said adsorbed heat into the other said gaseous stream during said second half of said operating cycle, said heat exchanging material being any of ceramic, stone, or fired clay gravel or pebbles, or fired pellets of iron ore, or other high thermal capacity pelletized minerals, said one of said two gaseous streams flowing downwardly through said packed beds, said the other gaseous stream flowing upwardly through said packed beds, said flow of said two gaseous streams being cyclic and alternating between said two vessels,

valving means connected to said intake-exit openings located in the upper part of said vessels provided for intake of one and exit of the other gaseous streams into and out of said vessels and for switching the flows of said two gaseous streams in preselected time intervals in the middle of said operating cycle between said two vessels to facilitate said cyclic countercurrent transfer of heat and mass between said two gaseous streams in said apparatus,

process control means for controlling said operating cycle and for maintaining a continuous operation of said valving means and said apparatus in said preselected time intervals,

blower means connected to said valving means provided for flowing said two gaseous streams countercurrently with respect to each other through said packed beds,

conduit means interconnecting said blower means with said valving means and with said vessels and providing for the intake, flow and discharge of said two gaseous streams into, through and out of said apparatus, and

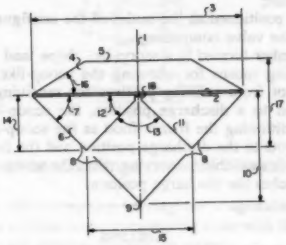
filter means for removing particulate matter from said two gaseous streams entering said apparatus.

4,708,001

FACETED GEM CUT FROM SHALLOW GEMSTONE MATERIAL

James R. Alburger, 5007 Hillard Ave., La Canada, Calif. 91011

Filed Sep. 4, 1985, Ser. No. 772,434
Int. Cl.[4] A44C *17/00*
U.S. Cl. 63—32 **2 Claims**



1. A faceted gem consisting of a gemstone having a faceted crown, a girdle, and a faceted pavillion, said pavillion being cut with a conical depression centered on the vertical axis of said gem, said conical depression having an included angle at the cone apex of from about 60° to 118°, and a base diameter of from about 10% to 75% relative to the girdle diameter, and a cone depth of from about 5% to 50% relative to the girdle diameter, the surface of said conical depression being polished to reflect light.

4,708,002

CIRCULAR KNITTING MACHINE INCORPORATING A DEVICE FOR SETTING TO WORK KNITTING CAMS, IN PARTICULAR FOR HOSE KNITTING

Francesco Lonati, Brescia, Italy, assignor to Lonati S.p.A., Brescia, Italy

Filed Dec. 5, 1985, Ser. No. 805,007
Claims priority, application Italy, Dec. 10, 1984, 23968 A/84
Int. Cl.[4] D04B *15/78*
U.S. Cl. 66—40 **6 Claims**

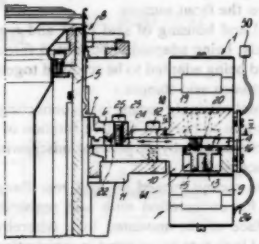
1. In a circular knitting machine with a supporting structure, a needle cylinder having an axis of rotation, a plurality of needles with needle butts in cooperation with said needle cylinder, and knitting cams selectively engageable with the needle butts,

a device for setting a knitting cam to work, comprising a slide member movable in a direction substantially perpendicular to said axis of rotation of the needle cylinder, said slide having one end portion thereof connected to said knitting cam,

a step motor supported on said supporting structure, transmission means for transmitting a preset motion from said step motor to said slide, and

an electronic machine control for controlling said step motor to cause said slide member to move said knitting cam thereon into a preset relative position with respect to said needle butts, wherein said transmission means com-

prise a rectilinear guide on said supporting structure and extending perpendicular to said axis of rotation of said needle cylinder for guiding said slide along a translatory motion path, a drive shaft of said step motor, a drive cam member in rigid rotatory relationship with said drive shaft and a cam follower member on said slide and in contact



engagement with said drive cam and wherein at least one of said needle butts has a radial extension greater than the radial extension of said needle butts other than said at least one needle butt, said at least one needle butt being adapted to be selectively engaged by said knitting cam depending on the position into which said slide is selectively shifted by said step motor rotation.

4,708,003

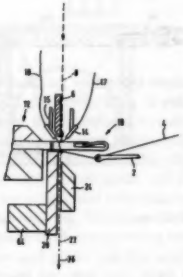
CROCHET TOOLS FOR PRODUCING STRIPS ON A CROCHET GALLOON MACHINE

Josef Berger, Hainstrasse 11, Schwaebisch Gmuend-Grossdeinbach, and Johann Berger, Obere Schloss-Strasse 114, Alfdorf, both of Fed. Rep. of Germany

Division of Ser. No. 560,003, Dec. 9, 1983, Pat. No. 4,603,561. This application Feb. 6, 1986, Ser. No. 866,880

Int. Cl.⁴ D04B *23/08*

U.S. Cl. 66—192 **6 Claims**



1. A crochet tool for producing bands in a crochet galloon machine having a plurality of clamped crochet needles and a knocking over bar, together with a device for feeding elastic threads, characterised by at least one comb-like part having means defining a plurality of slits extending parallel to one another for receiving the elastic threads during the feeding thereof;

the pitch of said slits in the comb being the same as the pitch of the clamped crochet needles said comb being mounted on a guide bar reciprocatingly mounted to said machine and means for reciprocating said guide bar so that said comb is laterally displaced by one needle division at a time, alternately to the left and to the right, in a timed manner to the operation of said crochet galloon machine.

4,708,004

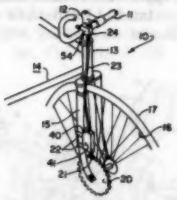
BICYCLE LOCK

Mark L. Allen, 1776 E. 13th St., Brooklyn, N.Y. 11229

Filed Jan. 15, 1987, Ser. No. 3,482

Int. Cl.⁴ B62H *5/14*

U.S. Cl. 70—226 **6 Claims**



1. A quick action bicycle lock adapted for mounting on a bicycle to permit immediate immobilization of the bicycle, said block comprising: a caliper brake for engaging a bicycle wheel to prevent rotation of the wheel; hand lever means mounted on the bicycle handlebar and connected to said caliper brake by a brake cable, said hand lever means being formed with a ratchet thereon; pawl means for engaging said ratchet to secure said hand lever means in its brake applying position; spring means for biasing said pawl means into engagement with said ratchet; trigger means for holding said pawl mean out of engagement with said ratchet so that said hand lever means can move freely between a brake applying and a non-brake applying position, said trigger means being movable to a non-holding position whereby said pawl means is free to engage said ratchet; and key operated means for disengaging said pawl mean from said ratchet to allow said hand lever means to return to its non-brake applying position.

4,708,005

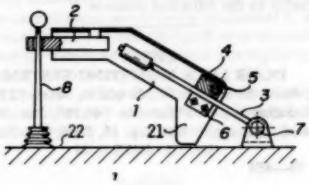
ANTI-THEFT DEVICE FOR AN AUTOMOBILE VEHICLE

Armand Bernacchi, Avenue des Vallées, F-74200 Thonon-les-Bains, France

Filed Dec. 10, 1985, Ser. No. 807,365

Int. Cl.⁴ E05B *65/12*

U.S. Cl. 70—238 **6 Claims**



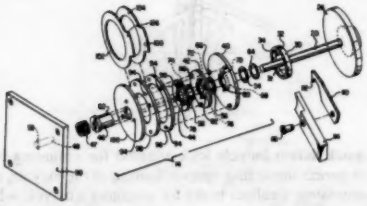
1. An anti-theft device for an automobile vehicle of the type including a handbrake lever movable between handbrake engaged and handbrake disengaged positions, and a gear shift lever, said anti-theft device consisting of immobilizing means attached to said handbrake lever and adapted to engage said handbrake lever of said vehicle to immobilize said handbrake lever when said lever is in said handbrake engaged position, and locking means mounted to said immobilizing means for locking said immobilizing means to said gear shift lever and preventing operation of said gear shift lever, wherein said immobilizing means comprises a casing forming a cover which pivotally envelopes and immobilizes said handbrake lever while in said engaged position and wherein said immobilizing means is a single rigid member which extends, in the locked position, between the gear shift lever and handbrake lever.

4,708,006

COMBINATION LOCKS

Earl I. Hodgson, Ottawa, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 421,844, Sep. 23, 1982, abandoned. This application Oct. 15, 1984, Ser. No. 661,040
Claims priority, application Canada, Jun. 4, 1982, 404842
Int. Cl.[4] E05B *37/04*
U.S. Cl. 70—303 R 3 Claims



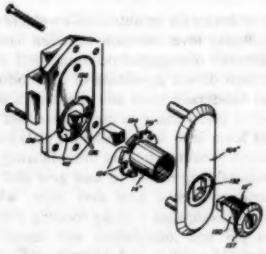
1. A combination lock comprising a housing, a dial secured to a spindle, a cam in said housing carried by said spindle, said cam having a smooth periphery on one side and a notch in a side edge adjacent said dial, and a drive pin in an opposing face, a wheel pack including a plurality of disks aligned consecutively as a pack adjacent each other at one end of said spindle mounted for semi-independent rotation in said housing, a first one of said disks having means for engaging said drive pin on said cam, and a drive pin for engaging means on a second disk of lesser diameter than said first disk, said second disk also having a drive pin for engagement with means on a third disk of lesser diameter than said second disk, each of said disks having pins, a first, a second and a third rotatable wheel gate, having apertures for receiving said pins on said first, second and third disks respectively, and a drop lever having a nose at one end adapted to be received in said notch in said cam and having its other end secured to a locking bolt slideably mounted in said housing, whereby, if the correct combination is dialed, said pins on said wheel pack are in alignment with said apertures in said wheel gates so as to be received therein so that the cam and spindle move into the housing causing said notch on said cam to receive said nose on said lever and rotation of the spindle and cam pulls said lever and said locking bolt inwardly to the unlocked position.

4,708,007

DOOR LOCK MOUNTING SYSTEM

Harry J. Stoia, 30 Lincoln St., Brighton, Mass. 02135

Continuation-in-part of Ser. No. 746,787, Jun. 20, 1985, abandoned. This application Sep. 15, 1986, Ser. No. 906,939
Int. Cl.[4] E05B *9/08*
U.S. Cl. 70—451 18 Claims



1. A mounting device for a surface mounted door lock having a drive member for actuating the lock and registration means, said device comprising:

a front section having a front flange and a rearwardly extending externally threaded barrel, said barrel being adapted to contain a tumbler mechanism;

a rear section having a rear flange and a forwardly extending internally threaded housing, the internally threaded housing being adapted to threadably receive the threaded barrel on the front section;

said barrel and housing of said front and rear sections, respectively, being adapted to be passed through a hole in a door and being adapted to be screwed together to grip the door between said flanges;

supplemental retaining means interconnecting the front and rear sections to prevent relative rotation of said front and rear sections thereby to prevent unscrewing of said sections once placed;

registration means formed on said rear flange of the rear section for cooperation with said registration means on the surface of the mounted lock whereby said surface mounted lock may be oriented in registration with the rear flange of the rear section;

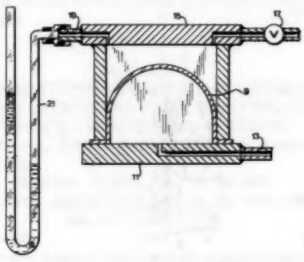
means for connecting the tumbler mechanism with the drive member of the lock, said connecting means extending through the rear section.

4,708,008

VOLUME CONTROL SUPERPLASTIC FORMING

Ken K. Yasui, Fountain Valley; Neil R. Williams, Huntington Beach; Richard C. Ecklund, Lakewood; Masashi Hayase, Fountain Valley, and Robert J. Walkington, Garden Grove, all of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Dec. 26, 1985, Ser. No. 813,600
Int. Cl.[4] B21D *26/02*
U.S. Cl. 72—60 7 Claims



4. An apparatus for superplastically forming a blank comprising:

a configurational die having a contour which is complementary to the shape of the part being formed;

means for holding said blank in said die at the forming temperature;

means for applying differential gas pressure against opposing sides of said blank so as to deform said blank into said configuration die;

means for containing the gas on said low pressure side of said blank; and

maeans for directly measuring the volume of said gas displaced by the deformation of said bank so that said gas pressure can be applied so as to deform said blank against time at a predetermined relationship.

4,708,009

BENDING DEVICE FOR THE PRODUCTION OF FORMED PARTS CONSISTING OF WIRE OR STRIP SECTIONS

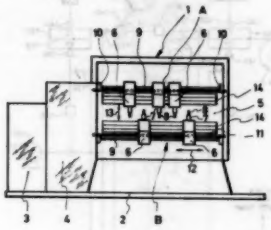
Friedhelm Post, Wallbach, Fed. Rep. of Germany, assignor to Alpha Maschinenbau AG., Zurich, Switzerland

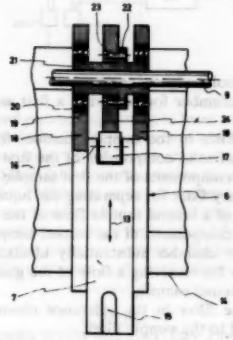
Filed May 29, 1986, Ser. No. 867,958

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1985, 3523828

Int. Cl.[4] B21D 37/12

U.S. Cl. 72—442 7 Claims





1. Apparatus for bending elongated metal such as wire or metal strip, of the type comprising a relatively stationary working plate, a drive shaft confined to rotation in shaft bearings which are spaced apart along the length of the drive shaft and are in fixed relation to said working plate, a tool slide to which a tool is attachable, a tool guide unit for support by said working plate and by which said tool slide is guided for reciprocation in opposite working directions that are transverse to the length of said guide shaft, cooperating means on said working plate and on the tool guide unit for confining the latter to adjusting displacement between said shaft bearings in directions parallel to said drive shaft and for fixing the tool guide unit in any selected position of such displacement, and a cam on said drive shaft, constrained to rotation therewith, that has a connection with said tool slide whereby the tool slide is reciprocated by rotation of said drive shaft, said apparatus being characterized by:

A. said tool guide unit having at least one cam bearing secured therein through which said drive shaft extends; and

B. said cam being fixed to a sleeve portion which

(1) extends axially therefrom,

(2) concentrically surrounds said drive shaft and is axially slidable along it, and

(3) is rotatably received in said cam bearing for radial support of the cam in its rotation with the drive shaft.

4,708,010

APPARATUS AND METHOD FOR CALIBRATING SPAN OF PRESSURE MEASURING INSTRUMENTS

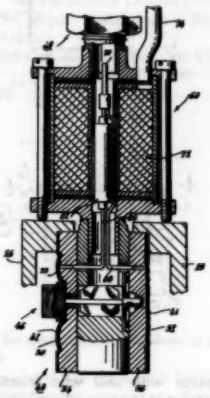
George E. Sgourakes, Millis, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Division of Ser. No. 661,807, Oct. 17, 1984, Pat. No. 4,638,656. This application Oct. 14, 1986, Ser. No. 918,053

The portion of the term of this patent subsequent to Jan. 27, 2004, has been disclaimed.

Int. Cl.[4] G01L 27/00

U.S. Cl. 73—4 R 10 Claims



1. In a pressure measuring instrument of the type including a sealed interior pressure chamber containing a fill-liquid and having diaphragm means to apply thereto an input pressure signal to be measured, said instrument further including sensing means responsive to the input pressure signal applied to said fill-liquid to produce a corresponding output signal;

that improvement for calibrating the span of the instrument comprising:

reference pressure means forming an integral part of said instrument and including means in communication with said fill-liquid to apply thereto a reference pressure of precisely-controlled predetermined magnitude; and

said reference pressure means being activatable to apply said reference pressure to said fill-liquid so as to produce from said sensing means an output signal corresponding to said reference pressure magnitude;

whereby the span of the instrument can be monitored and adjusted as necessary to assure that the output signal will correspond exactly to said reference pressure magnitude.

4,708,011

APPARATUS AND METHOD FOR DETERMINING THE PROPERTIES OF FIBER PULP

Paavo Rautakorpi, Tampere; Risto Mänttäri, Anjala; Heikki Liimatainen, Inkeroinen; Heikki Pernu, Nattari; Heikki Tuomainen, and Hannu Rusanen, both of Tampere, all of Finland, assignors to OY Tampella AB, Tampere, Finland

Filed Apr. 30, 1986, Ser. No. 857,473

Claims priority, application Finland, May 3, 1985, 851770

Int. Cl.[4] G01N 5/00, 11/02

U.S. Cl. 73—63 34 Claims

1. An apparatus for measuring properties of fiber pulp, comprising:

a batching vessel for conveying a volume of fiber pulp sample;

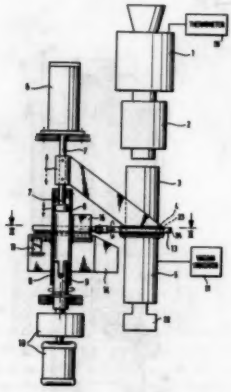
a filtering chamber engagable with said batching vessel for receiving said volume of fiber pulp sample therefrom;

vacuum generating means attached to said filtering chamber

for generating a reduced pressure within said chamber for filtering said volume of fiber pulp sample in said filtering chamber;

a wire frame for filtering said volume of fiber pulp sample in said filtering chamber, said filtering chamber having means for positioning said wire frame therein at a first position for receiving said volume of fiber pulp sample from said batching vessel;

weighing means for measuring the weight of the filtered



sample together with said wire frame, said weighing means being located at a second position spaced from said first position; and

powered transfer means for moving said wire frame between said first and second positions;

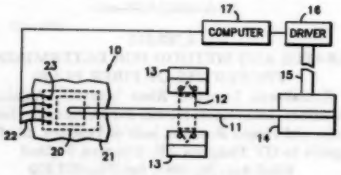
whereby, after said sample is filtered on said wire frame, said wire frame and said filtered sample are moved by said powered transfer means from said first position to said second position where said wire frame and said filtered sample are weighed.

4,708,012

METHOD AND APPARATUS FOR HIGH PRESSURE TESTING OF SOLID STATE PRESSURE SENSORS

Lee E. Folk, Phoenix, and Carl E. Derrington, Carson Tempe, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 19, 1986, Ser. No. 897,955
Int. Cl.[4] G01L *27/00*
U.S. Cl. 73—4 R **9 Claims**



1. A method of performing a high pressure test on a solid state pressure sensor comprising the steps of:

positioning a die in a high pressure tester;

positioning a probe of said high pressure tester in contact with a surface of said die;

exerting a force on said die using said probe;

measuring an electrical output of said die; and

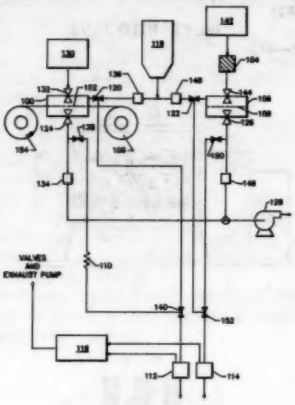
adjusting a resistance of said die if said measured electrical output is not within a preselected range.

4,708,013

LIQUID WATER CONTENT ANALYZER

Dwight A. Landis, P.O. Box 8062, Calabasas, Calif. 91302

Filed Feb. 2, 1987, Ser. No. 9,502
Int. Cl.[4] G01N *30/66, 30/70*
U.S. Cl. 73—23.1 **13 Claims**



1. An aerosol analyzer, comprising:

a sample chamber for receiving a first sample flow of an aerosol;

a sample filter in the sample chamber for separating the liquid and solid components of the first sample from the gaseous components of the first sample;

a preliminary filter for separating the liquid and solid components of a second sample flow of the aerosol from the gaseous components of the second sample;

a reference chamber substantially identical to the sample chamber for receiving a flow of the gaseous components of the second sample;

a reference filter in the reference chamber substantially identical to the sample filter;

a source of a carrier gas for evaporating the liquid components of the first sample from the sample chamber and for evaporating any liquid components and adsorbed water vapor from the reference chamber;

a chromatographic separation column for separating the water vapor from the evaporated components of the first sample; and

a detector for measuring the quantity of water separated by the separation column and the quantity of water evaporated from the reference chamber.

4,708,014

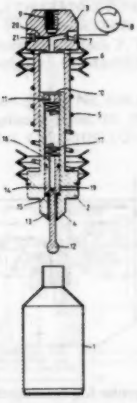
DEVICE FOR TESTING OF CONTAINERS AS TO LEAKAGE OR DEFECTS

Bernt Janitz, Dilling, Norway, assignor to 501 A/s Moss Glasveark, Moss, Norway

PCT No. PCT/NO85/00043, § 371 Date Mar. 5, 1986, § 102(e) Date Apr. 24, 1986, PCT Pub. No. WO86/00701, PCT Pub. Date Jan. 30, 1986
PCT Filed Jul. 11, 1985, Ser. No. 849,511
Claims priority, application Norway, Jul. 13, 1984, 842871
Int. Cl.[4] G01M *3/32*
U.S. Cl. 73—37 **4 Claims**

1. A device for pneumatic testing of containers especially plastic containers, as to leakage or defects, comprising: a first piston (2); a first cylinder chamber connected to an opening of a container through a channel in the first piston; a pressure gauge (8) for indicating pneumatic pressure in the first cylinder chamber; means for pressurizing the container; the first piston

(2) including means for sealing the container opening when the container is pressurized, the pressurizing means (5) including a plurality of channels and openings (13, 16, 11, 7) for providing an air connection between the container and the pressure gauge (8); a second piston (14) slidably mounted in a cylinder in the first piston; means for biasing the second piston (14) toward the container, the first piston (2) including a vent channel (19) having a first end open to the atmosphere, the biasing



means and second piston cooperating to form a seal at a second end of the vent channel (19) to prevent fluid communication between the container and the vent channel (19); and a rod shaped feeler (12) slidably mounted inside the first piston, the rod shaped feeler (12) being arranged to have a first end extending inside the container and a second end contacting the second piston such that contact between the feeler (12) and a defect blocking the container opening displaces the second piston to vent the container to the atmosphere.

4,708,015

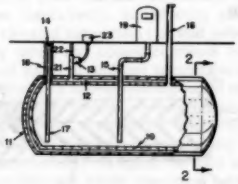
STORAGE TANKS WITH SECONDARY CONTAINMENT MEANS AND NON-VISUAL LEAK DETECTION MEANS

Bruce R. Sharp, 4090 Rose Hill Ave., Cincinnati, Ohio 45229

Continuation-in-part of Ser. No. 740,869, Jun. 3, 1985, Pat. No. 4,607,522, which is a continuation-in-part of Ser. No. 544,013, Oct. 21, 1983, Pat. No. 4,523,454, and a continuation-in-part of Ser. No. 580,800, Feb. 16, 1984, Pat. No. 4,524,609, which is a continuation-in-part of Ser. No. 544,012, Oct. 21, 1983, abandoned. This application Oct. 25, 1985, Ser. No. 791,578

Int. Cl.[4] G01M *3/26*

U.S. Cl. 73—49.2 **19 Claims**



1. An underground storage tank system for liquids having secondary containment capability and leakage detection capability, comprising:

(a) a rigid inner tank for storing the liquid, having fill pipe and dispensing line;

(b) a flexible jacket capable of withstanding sudden stresses without breaking and having sufficient strength to contain any liquid leaked from the rigid inner tank, said flexible jacket encasing the inner tank so as to form a closed space between the tank and the jacket;

(c) detecting liquid which at least partially fills the closed space; and

(d) non-visual leak detection means associated with the closed space for detecting any change in level of detecting liquid.

4,708,016

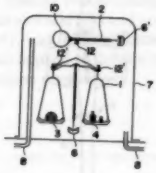
METHOD FOR MEASURING VOLUME AND APPARATUS THEREFOR

Seiji Akegi, Ube, Japan, assignor to UBE Industries, Ltd., Yamaguchi, Japan

Filed Oct. 23, 1986, Ser. No. 923,393

Int. Cl.[4] G01F *17/00*

U.S. Cl. 73—149 **6 Claims**



1. A method for measuring the volume of a sample, comprising the steps of:

measuring the weight of the sample by means of a balance within a sealed vessel containing a first gas;

then replacing the first gas in the vessel with a second gas having a density different from that of the first gas;

measuring the weight of the sample by means of the balance within the sealed vessel containing the second gas to determine a change of weight of the sample corresponding to the change of the gas; and

calculating the volume of the sample according to Archimedis' principle as a function of the value of the difference between the density of the first gas and the second gas and the value of the change of weight of the sample corresponding to the change of the gas.

4,708,017

FLOATING HYDROMETER WITH ENERGY DISSIPATING BAFFLE

William A. Kownurko, Bryan, Tex., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Jun. 27, 1986, Ser. No. 879,766

Int. Cl.[4] G01N *9/10, 15/06*

U.S. Cl. 73—438 **10 Claims**

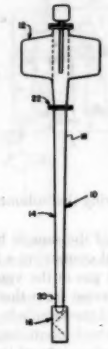
1. A floating hydrometer employable for purposes of obtaining measurements of the presence of suspended solids in a fluid substance contained in a receptacle comprising:

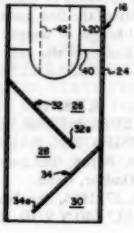
a. a probe portion operative as an instrument-bearing housing, said probe portion being floatable on the surface of the fluid substance contained in the receptacle;

b. an elongated tubular element having a hollow interior and at least one open end so as to enable the flow into said hollow interior of said elongated tubular element through said open end thereof of fluid substance contained in the receptacle, said elongated tubular element having the other end thereof affixed to said probe portion so as to form an integral structure therewith; and

c. energy dissipating baffle means having a first mode of action and a second mode of action and including a member having a hollow interior, said member having one end thereof secured to said open end of said elongated tubular element so as to establish a flow path therebetween for the flow of fluid substance, said member having the other end

thereof open so as to enable the flow of fluid substance contained in the receptacle into and out of said hollow interior of said member, said member including a first deflector supported in said hollow interior thereof so as to extend in a first direction and a second deflector supported in said hollow interior thereof so as to extend in a second direction, said first deflector and said second deflector being operative to divide said hollow interior of said member into a first chamber-like area, a second chamber-like area, and a third chamber-like area, said member further including a first aperture formed in said member in juxtaposed relation to said first deflector and a second aperture formed in said member in juxtaposed relation to said second deflector, said energy dissipating baffle means being operative in accord with said first mode of action to cause the flow of fluid substance through said first aperture between said second chamber-like area and the receptacle and through said second aperture between said third chamber-like area and the receptacle so as to thereby effectuate the dissipation of the fluid energy of the fluid substance in said second chamber-like area and of the fluid substance in said third chamber-like area such that the fluid substance in said first chamber-like area remains calm, said energy dissipating baffle means being operative in accord with said second mode of action to cause the flow of fluid substance through said first aperture between said second chamber-like area and the receptacle and through said second aperture between said third chamber-like area and the receptacle so as to thereby effectuate an equalization of the pressure of the fluid substance in said second chamber-like area and of the pressure of the fluid substance in said third chamber-like area such that the fluid substance in said first chamber-like area remains calm.



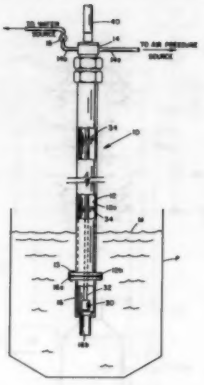


4,708,018

DRILLING MUD DENSITY PROBE

Gregory D. Brown, Norman, Okla., assignor to Technical Oil Tools Corporation, Norman, Okla.

Filed Oct. 15, 1986, Ser. No. 919,010
Int. Cl.[4] G01N 9/28
U.S. Cl. 73—439 **8 Claims**



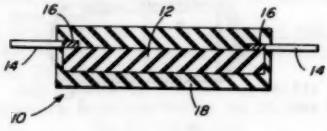
1. A mud density probe for determining the density of well drilling mud confined in a tank comprising: an elongated tube vertically insertable in the mud; manifold means secured to the upper end of said tube for connecting the bore of said tube to a variable pressure source of pressured air; nozzle means secured to the bottom end of said tube defining an axial discharge passage for bubbles of pressured air; said axial discharge passage having a bore of substantially smaller diameter than the bore of said tube adjacent said nozzle means; a cleaning plunger mounted in said tube bore for reciprocal movement, said plunger having an external diameter slightly less than said axial discharge passage, whereby passage of said plunger through said axial passage removes congealed mud from the surface of said axial passage and means for reciprocating said plunger through said axial passage to clean same.

4,708,019

MEASUREMENT OF STRAIN EMPLOYING A PIEZORESISTIVE BLEND OF A DOPED ACETYLENE POLYMER AND AN ELASTOMER

Michael Rubner, Chelmsford, and Enid K. Sichel, Lincoln, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Jun. 27, 1984, Ser. No. 624,946
Int. Cl.[4] G01B 7/16
U.S. Cl. 73—760 **9 Claims**



1. A method for measuring strain resulting from stress applied to a sample, comprising:

a. applying an encapsulated piezoresistive polymer file to said sample, said film consisting essentially of an elastomer having a doped electrically conductive polyacetylene uniformly and homogeneously blended throughout the

elastomer, the polyacetylene being formed by polymerizing acetylene gas in the presence of a catalyst;

b. applying an electric field across said piezoresistive polymer film; and

c. detecting a change in electrical resistance in said piezoresistive polymer film in response to stress applied to the sample.

4,708,020

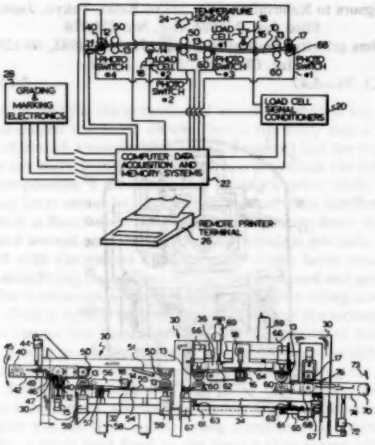
TEMPERATURE COMPENSATING CONTINUOUS PANEL TESTER

Kenneth K. Lau, Vancouver, and Jack T. Yelf, West Vancouver, both of Canada, assignors to MacMillan Bloedel Limited, Vancouver, Canada

Continuation-in-part of Ser. No. 849,189, Apr. 7, 1986, abandoned. This application Jan. 16, 1987, Ser. No. 3,839

Int. Cl.⁴ G01N *3/20*

U.S. Cl. 73—852 **17 Claims**



1. An apparatus for determining the stiffness at ambient temperature of a panel tested at elevated temperature while moving in a "S" shaped path comprising first deflector means between a first pair of reaction rolls relatively positioned to bend the panel in a first direction into a first curved shape of one portion of said "S" shaped path, second deflector means between a second pair of reaction rolls relatively positioned to bend said panel in a second direction opposite to said first direction into a second curved shape of another portion of said "S" shaped path, first and second load measuring means measure the loads to bend said panel into said first and second curved shapes respectively, temperature sensing means to measure said elevated temperature of said panel at which said panel is being tested and computer means to determine the stiffness of said panel at ambient temperature based on said loads measured by said load measuring means and said elevated temperature sensed by said temperature sensing means.

8. An apparatus for determining the stiffness of a panel moving along an "S" shaped path comprising a main frame, a first load frame movably mounted on said main frame and carrying a first deflector means interposed between a first pair of positioning rolls and a first height adjusting means to adjust the position of said deflector means relative to said first pair of positioning rolls, a first pair of reactional rolls mounted on said main frame each forming a nip with the adjacent one of said first pair of positioning rolls, said first deflector means cooperating with said first pair of reaction rolls to deform said panel in a first direction into a first curved shape forming a first curved portion of said "S" shaped path, a sub-main frame, means adjustably mounting said sub-main frame on said main frame, a second load frame movably mounted on said sub-main frame and carrying a second deflector means interposed between a second pair of positioning rolls, a second height adjusting means to adjust the position of said second deflector means relative to said second pair of positioning rolls, a second pair of reaction rolls mounted on said sub-main frame each forming a nip with the adjacent one of said second pair of positioning rolls, said second deflector means cooperating with said second pair of reaction rolls to deform said panel in a second direction opposite to said first direction to a second curved shape forming a second curved portion of said "S" shaped path, operating means to operate said first and second height adjustment means to relatively adjust each of said first and second deflector means and said first and second pairs of positioning rolls respectively to change the curvature of said first and second curved portions and to adjust the position of said sub-main frame in accordance with a modified "S" shaped path determined by the relative repositioning of said first and second deflector means and said first and second pairs of positioning rolls respectively, and first and second load sensing means to measure the loads applied to deform the panel into first and second curved portions respectively.

4,708,021

ARRANGEMENT FOR CONTACTLESS MEASUREMENT OF THE VELOCITY OF A MOVING MEDIUM

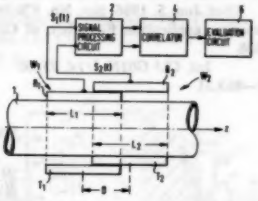
Hans Braun, Karlsruhe, and Georg Schneider, Stutensee-Spöck, both of Fed. Rep. of Germany, assignors to Endress u. Hauser GmbH u. Co., Fed. Rep. of Germany

Filed Jan. 31, 1986, Ser. No. 825,077

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1985, 3504622

Int. Cl.⁴ G01P *5/20*

U.S. Cl. 73—861.06 **8 Claims**



1. Arrangement for the contactless measurement of the velocity of a moving medium comprising two transducers having detection regions which are offset with respect to each other in the direction of movement of the medium and which generate electrical output signals influenced by the spatial position of inhomogeneities of the moving medium, the output signals generated in accordance with a spatial weighting function of each transducer, the detection regions of the two transducers partially overlapping in such a manner that the gradient of the spatial cross correlation function of the spatial weighting functions for the spatial displacement zero is different from the zero vector, and means for calculating the time cross correlation function of the two signals and for determining the gradient of the time cross correlation function of the two signals for the displacement time zero to determine the velocity of the moving medium.

4,708,022

FLUID FLOW MONITORING

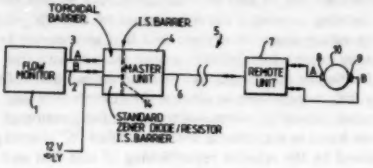
Rodney C. Johnson, Sussex, Great Britain, assignor to Bestobell Sparling Limited, Sussex, Great Britain

Filed Jun. 17, 1986, Ser. No. 875,310

Claims priority, application United Kingdom, Jun. 25, 1985, 8516032

Int. Cl.[4] G01F *1/66*

U.S. Cl. 73—861.28 17 Claims



9. Interface means for connecting the signal generating means and the signal receiving means to the monitoring means of a fluid flow monitoring assembly comprising signal generating means and signal receiving means for transmitting signals into a flowing fluid and for receiving the signals after transmission through the fluid respectively and monitoring means for controlling the transmission of signals by the signal generating means, sensing the signals received by the signal receiving means, and thereby monitoring the fluid flow, the interface means comprising first and second converting assemblies, said first converting assembly being adapted to couple a transmit pulse from said monitoring means into a transmission medium for conveying said transmit pulse and a substantially constant power supply signal to said second converting assembly which is responsive to said power supply signal to convert said transmit pulse from said transmission medium to a pulse for application to said signal generating means.

4,708,023

SAMPLE HANDLING APPARATUS

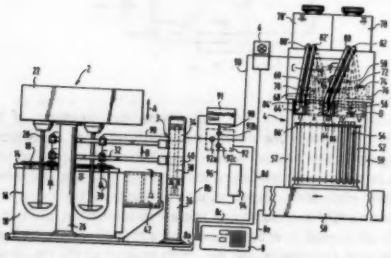
Ortwin Schneider, Weiterstadt, and Nikolaos Georgitsis, Heusenstamm, both of Fed. Rep. of Germany, assignors to Erweka Apparatebau GmbH, Heusenstamm, Fed. Rep. of Germany

Filed Jun. 5, 1986, Ser. No. 870,967

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 3520438

Int. Cl.[4] G01N *1/14, 35/00*

U.S. Cl. 73—863.31 12 Claims



1. A sample handling apparatus comprising:

a sample unit having a plurality of probes for taking liquid samples from a corresponding plurality of reaction vessels of a reaction unit,

a sample collecting unit having a plurality of pipes for releasing the liquid samples into test tubes arranged in said sample collecting unit below said pipes, as well as for taking in replenishing liquid and, for this purpose, being adapted to be immersed into replenishing liquid in a first storage means also arranged in said sample collecting unit,

lines connecting said probes with said pipes,

a transport means connected to said lines for transporting the liquid samples from said probes to said test tubes and for transporting the replenishing liquid from said first storage means to said reaction vessels, and

a control means for controlling at least the operation of the sampling unit, the sample collecting unit and the transport means.

4,708,024

GYRO APPARATUS

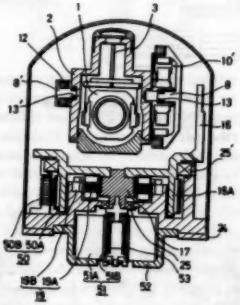
Takeshi Hojo, and Takafumi Nakaishi, both of Kuroiso, Japan, assignors to Kabushikikaisha Tokyo Keiki, Tokyo, Japan

Filed Jun. 9, 1986, Ser. No. 871,876

Claims priority, application Japan, Jun. 10, 1985, 60-125867

Int. Cl.[4] G01C *19/30, 19/38*

U.S. Cl. 74—5.47 5 Claims



1. A gyro apparatus comprising:

(a) a gyro casing incorporating therein a gyro the spin axis of which is made substantially horizontal;

(b) a supporting apparatus for supporting said gyro casing with a freedom of three axes;

(c) a north-seeking apparatus for giving a north-seeking action to said gyro;

(d) a follow-up ring having a follow-up shaft at its center which follows said gyro casing around its substantially vertical axis;

(e) a binnacle for supporting said follow-up shaft;

(f) a servo motor for rotating said follow-up shaft and a slip ring for supplying power to said gyro through said slip ring, said follow-up ring being formed as fork-shaped and having a downwardly protruded skirt portion at the outer peripheral portion of said servo motor and being rotatably supported by said binnacle with a first ball bearing which is located at the outer periphery of said skirt portion, in a cantilever fashion, and said follow-up shaft being rotatably supported by said binnacle through a second ball bearing which has a smaller diameter than said first ball bearing; said servo motor being of a pancake-type servo motor of a direct drive system, a rotor of said servo motor being fixed to said follow-up shaft between said first and second ball bearings, a stator of said servo motor being attached to said binnacle at a position corresponding to said rotor; and

(g) a slip ring attached to the outer periphery of said skirt portion.

4,708,025

SIMPLE DEVICE FOR THE ACTUATION OF AN ANIMAL-SHAPED TOY

James Lee, P.O. Box 10780, Taipei, Taiwan

Filed Jan. 3, 1986, Ser. No. 815,803
Int. Cl.[4] F16H 21/24; A63H 13/02
U.S. Cl. 74—44 4 Claims

1. A device for the actuation of an animal-shaped toy, said animal-shaped toy being divided into a toy body and a fixed support in such a manner that the fixed support and the interior of the toy body together define a space to contain the following components: a driving device having a drive shaft; a revolving lever means having first and second ends, the first end of which is fixed to the drive shaft; a connecting lever having first and second ends, the first end of which is pivotally connected with the second end of the revolving lever means; a male slide fitting component having one fixed end and another end that constitutes a free beam; a female slide fitting component which is loosely pivotally connected with the second end of the connecting lever and fixed to the interior of the toy body; a bore in the female slide fitting component which permits the female slide fitting component to slide along the male slide fitting component for reciprocal movement thereon; wherein the loosely pivoted connection between the connecting lever and the female slide fitting component is characterized by: a pivot stud fixed to the female slide fitting component, and a pivot hole in the connecting lever defining a circumferential edge which loosely surrounds the pivot stud, whereby, when the driving device drives the revolving lever means to cause the female slide fitting component to slide reciprocally on the male slide fitting component by means of the connecting lever, the pivot stud fixed to the female slide fitting component separates from the circumferential edge of the pivot hole in the connecting lever as the revolving lever means passes a top dead center position, and then reengages the circumferential edge of the pivot hole to produce a sudden collision which will be apparent on the toy body as a funny trembling effect.

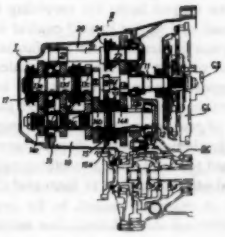
4,708,026

POWER TRANSMISSION WITH ANCILLARY CHANGE-SPEED MECHANISM FOR EXTRA-LOW-SPEED GEAR TRAIN

Kazuhito Ikemoto, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jun. 12, 1986, Ser. No. 873,707
Claims priority, application Japan, Jun. 12, 1985, 60-127583
Int. Cl.[4] F16H 3/08
U.S. Cl. 74—359 5 Claims

1. A power transmission for a motor vehicle comprising a housing formed to contain a main change-speed mechanism and an ancillary change-speed mechanism, said main change-speed mechanism including an input shaft rotatably mounted within said housing and drivingly connected to an output shaft of a prime mover of the vehicle, an output shaft arranged in parallel with said input shaft and rotatably mounted within said housing, a first drive gear integrally mounted on said input shaft for rotation therewith, a second drive gear rotatably mounted on said input shaft and being formed so as to be larger in diameter than said first drive gear, a first driven gear rotatably mounted on said output shaft and in meshing engagement with said first drive gear to provide a low speed gear train, and a second driven gear integrally mounted on said output shaft for rotation therewith and being formed so as to be smaller in diameter than said first driven gear, said second driven gear being in meshing engagement with said second drive gear to provide a high speed gear train,



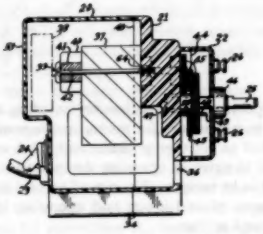
wherein said ancillary change-speed mechanism comprises an ancillary shaft arranged in parallel with said input shaft of said main change-speed mechanism and rotatably mounted within said housing, an input gear rotatably mounted on said ancillary shaft and in meshing engagement with said first drive gear, said input gear being formed so as to be larger in diameter than said first drive gear, an output gear integrally mounted on said ancillary shaft for rotation therewith and in meshing engagement with said second drive gear, and clutch means mounted on said ancillary shaft to engage said input gear with said ancillary shaft.

4,708,027

GEAR MOTOR HOUSING

Gustave H. Stenner, 10708 Executive Dr., Jacksonville, Fla. 32225

Filed Jun. 16, 1986, Ser. No. 874,707
Int. Cl.[4] F16H 1/12; F04B 17/00
U.S. Cl. 74—421 A 16 Claims



1. A disassemableable housing for a gear motor wherein the gear motor includes an electric motor, a high speed motor shaft, a ventilation van blade mounted on the motor shaft, a speed reduction gear train operatively connected to the motor shaft and a low speed output shaft connected to the gear train; said housing comprising only three sections defined by a gear case cover, a fan and motor cover, and a central support section, each said cover having an open end and an oppositely disposed closed end, said open end of said covers interfitting respectively with two open ends of said central section to form

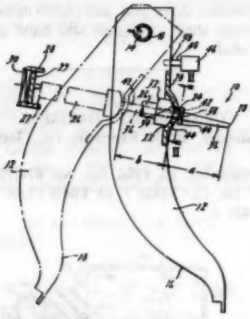
an enclosure for said gear motor; said fan and motor cover having a passageway through its said closed end, said fan blade being disposed closely adjacent said passageway for forcing air to exit from said housing; said gear case cover including a journaled passageway to support said output shaft therethrough, journals for shafts upon which are mounted gears of said gear train, said central support section having a passageway to permit inflow of air from outside said housing to inside said housing, said passageway in said central support section being located adjacent said gear case cover and said passageway communicating with space internally of said central support section and said fan and motor cover around said motor and thence out said passageway in said fan and motor cover, and including two tapped holes for receiving two screws to mount and suspend said motor to said central support section entirely within space formed between said fan and motor cover and said central support section, a journaled passageway through said support section to receive said motor shaft for operative connection to said gear train, and journals for said shafts for gears of said gear train and said output shaft; and manually movable clamping means disposed outwardly of and positively attached to said housing to clamp each of said covers to said central support section to form said disassembleable housing.

4,708,028

OPERATING LEVER MECHANISM

Ronald P. Pardy, Tiptree, England, assignor to Ford Motor Company, Dearborn, Mich.

Continuation of Ser. No. 156,302, Jun. 4, 1980, abandoned. This application Sep. 16, 1982, Ser. No. 418,887
Int. Cl.[4] G05G *1/14*
U.S. Cl. 74—512 **10 Claims**



1. An operating lever mechanism including a lever pivotably mounted to a structure for pivotal movement between a rest position and an engaged position; and a link means connected at one end to move an operating device and at its other end to said lever to be reciprocably moved by said lever in the plane of movement of said lever; said operating lever mechanism characterized in that:

said lever includes an abutment surface;

said link means includes an abutment surface for abutting said abutment surface of said lever when said lever is moved from its rest position to its engaged position; and

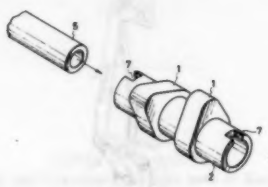
retaining means coupled to the link means for movement therewith the retaining alignment of said lever with said link means when said abutment surface of said link means is separated from said abutment surface of said lever a distance equal to or greater than the normal distance said abutment surface of said lever travels when said lever moves between its engaged position its and rest position.

4,708,029

CAMSHAFT

Shigeru Urano, Saitama, Japan, assignor to Nippon Piston Ring Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 773,189, Sep. 6, 1985, abandoned. This application Dec. 15, 1986, Ser. No. 942,036
Claims priority, application Japan, Sep. 11, 1984, 59-188925
Int. Cl.[4] F16H *53/00*; B23P *15/00*; B21D *39/00*; F01L *1/46*
U.S. Cl. 74—567 **4 Claims**



1. A camshaft for use in an internal combustion engine comprising:

a plurality of cam lobes adapted for operating the valves of an internal combustion engine, said lobes each having an opening therethrough, said opening being aligned generally with the axis of rotation of said lobe; and

a central lobe supporting member, said member being comprised of a plurality of tubular collars disposed to fit within said openings in said lobes, the ends of said collars being spaced one from the other to form at least one circumferential gap, said central lobe supporting member further including a central tubular member expanded within said collars, said central tubular member being expanded within said gap to form bearing journals for said cam shaft, each of said collars including a notch on at least one end thereof, each said notch being disposed to engage a portion of said central tubular member.

3. A camshaft for use in an internal combustion engine comprising:

a plurality of cam lobes adapted for operating the valves of an internal combustion engine, said lobes each having an opening therethrough, said opening being aligned generally with the axis of rotation of said lobe; and

a central lobe supporting member, said member being comprised of a plurality of tubular collars disposed to fit within said openings in said lobes, the ends of said collars being spaced one from the other to form at least one circumferential gap, said central lobe supporting member further including a central tubular member expanded within said collars, said central tubular member being expanded within said gap to form bearing journals for said cam shaft, wherein each end of each of said collars includes a notch engaging an expanded portion of said central tubular member.

4. A cam shaft for use in an internal combustion engine comprising:

a plurality of cam lobes adapted for operating the valves of an internal combustion engine, said lobes each having an opening therethrough, said opening being aligned generally with the axis of rotation of said lobe; and

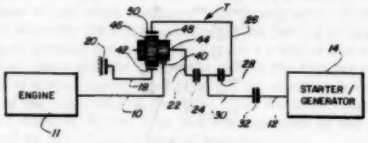
a central lobe supporting member, said member being comprised of a plurality of tubular collars disposed to fit within said openings of said lobes, each of said collars having two ends spaced apart from each other to form at least one circumferential gap, said central lobe supporting member further including a central tubular member expanded within said collars, an end of each of said collars including a notch engaging an expanded portion of said central tubular member, said central tubular member being expanded within each of said circumferential gaps to form bearing journals for said cam shaft.

4,708,030

MULTI-RANGE STARTER-GENERATOR DRIVE

Michael A. Cordner, Manchester, Mo., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Mar. 18, 1985, Ser. No. 713,879
Int. Cl.[4] F16H 37/06
U.S. Cl. 74—686 8 Claims



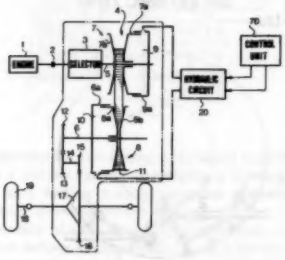
1. A multi-range starter-generator drive connected between a variable speed engine and a generator, comprising: a first shaft drivingly coupled to the variable speed engine, a second shaft drivingly coupled to the generator to be driven at constant speed, a controllable hydro-viscous dissipative clutch having a movable control member said hydro-viscous clutch being operatively connected to said shafts controllable for constant speed drive of the second shaft and the generator with the engine operating at variable speeds, and plural drive output means interposed between said first shaft and said clutch providing different drive ratios between said engine and said clutch to achieve a more nearly constant speed input to said clutch over the entire range of engine spees.

4,708,031

TRANSMISSION RATIO CONTROL SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION

Yoshihiko Morimoto, Mitaka, and Kazunari Tezuka, Asaka, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 2, 1987, Ser. No. 63
Claims priority, application Japan, Jan. 9, 1986, 61-2689
Int. Cl.[4] B60K 41/12, 41/18, 41/16
U.S. Cl. 74—866 7 Claims



1. A control system for a continuously variable transmission for transmitting the power of an internal combustion engine to driving wheels of a motor vehicle through a clutch, having a drive pulley including a hydraulically shiftable disc and a first hydraulic cylinder for shifting the disc, a driven pulley including a hydraulically shiftable disc and a second hydraulic cylinder for operating the disc of the driven pulley, a belt engaged with both pulleys, a transmission ratio control valve having ports and a spool, a line pressure control valve having ports and a spool, a first hydraulic circuit having a pump for supplying oil to the first and second cylinders through the line pressure control valve which controls line pressure and the transmission ratio control valve, the system comprising:

detecting means for detecting load on the engine and for producing a load signal;

first means responsive to the load signal for producing a desired line pressure signal;

second means responsive to the desired line pressure signal for shifting the spool of the line pressure control valve so as to provide control the line pressure;

detecting means for detecting a stop of the vehicle and producing a stop signal;

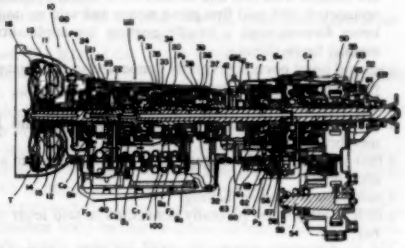
third means responsive to the stop signal for increasing the line pressure so as to operate the second hydraulic cylinder to increase the transmission ratio.

4,708,032

TRANSMISSION CONTROL DEVICE HAVING SELECTABLE ROTATION SPEED DETECTOR

Yoshiharu Harada, Toyota; Yutaka Taga, Aichi; Kagenori Fukumura, Toyota; Yoichi Hayakawa, Toyoake, and Masao Kawai, Chiryu, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Aisin-Warner Kabushiki Kaisha, both of Aichi, Japan

Filed Jan. 21, 1986, Ser. No. 820,074
Claims priority, application Japan, Jan. 19, 1985, 60-7770
Int. Cl.[4] B60K 41/18; F16H 37/00
U.S. Cl. 74—866 5 Claims



1. A transmission control device having selectable rotation speed detecting means for controlling a transmission system having a plurality of speed changing ratios and comprised of a main transmission and a sub transmission connected to the output shaft of the main transmission and wherein the transmission control device comprising:

first rotation speed detecting means associated with the output shaft of the main transmission;

second rotation speed detecting means associated with the output shaft of the sub transmission;

an electronic control means for receiving signals from various sensors for sensing the running state of the vehicle and to determine the speed changing ratio and to generate a control signal for controlling the speed changing mechanisms of the respective transmissions; and

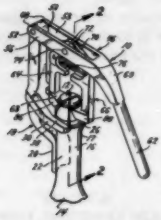
a speed changing mechanism driving means for driving said speed changing mechanisms of the main and sub transmissions in accordance with the control signals from the electronic control means, wherein the electronic control means has judging means for determining whether the sub transmission is in the transient period of speed changing operation, and wherein the electronic control means controls, when the sub transmission is in transient period, the speed changing operation in accordance with an output signal from the second rotation speed detecting means.

4,708,033

STOPPER REMOVER

Lester E. Eash, 7134 S. Marina Pacifica, Long Beach, Calif. 90803

Filed May 30, 1984, Ser. No. 615,170
Int. Cl.[4] B67B *7/32*
U.S. Cl. 81—3.37 **18 Claims**



1. A tool for removing the stopper from a bottle including:
a frame member having:
a yoke portion extending sidewardly therefrom and formed with first and second fingers spaced apart a first predetermined distance;
a first pivot portion disposed above said yoke portion;
a support portion projecting below said yoke and including a pad facing in a direction similar to the direction said yoke extends and adapted to engage the bottle;
an elongated lever member having an elongated lever member formed with first and second ends, said first end being connected with said first pivot means and said second end being formed with a handle portion for application of manual force thereto;
a second pivot portion pivotally connected to said first pivot portion of said base member; and
a first jaw member having:
a fourth pivot portion pivotally connected to said lever member; and
a first jaw adapted for engagement with a stopper in a first direction;
a second jaw member having:
a fifth pivot portion pivotally connected to said lever member; and
a second jaw adapted for engagement with a stopper in a second direction opposite to said first direction;
said first and second jaws being narrower than said first predetermined distance between said fingers so that said first and second jaws can fit therebetween; and
bias means connected between said first and second jaw members to bias them toward each other.

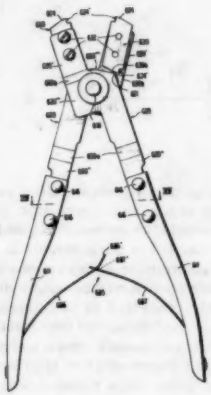
4,708,034

PINCER-LIKE TOOL

Hans Oetiker, Oberdorfstrasse 21, CH-8810 Horgen 2, Switzerland

Continuation-in-part of Ser. No. 887,435, Jul. 21, 1986, which is a continuation-in-part of Ser. No. 777,340, Sep. 18, 1985. This application Sep. 15, 1986, Ser. No. 906,908
Int. Cl.[4] B25B *27/00*
U.S. Cl. 81—9.3 **18 Claims**

1. A pincer-like tool for tightening clamps of the type provided with overlapping band portions each including an outwardly projecting embossment means that extends generally in the circumferential direction of the clamp and offers by its opening an engaging surface disposed substantially transversely to the circumferential direction and located at the end of the embossment means remote from the free end of the respective band portion, comprising two main standard pincer-like members of punched-out steel plate material each having a head section and a shank-like connecting section, two handle members fastened to corresponding connecting sections, means pivotally connecting the two standard pincer-like members with each other in an area intermediate the head section and the connecting section, and further means including an attachable stamped-out part attached to said head section to thereby provide by said attachable part a nose-like end portion detachably secured at each head section of the standard pincer-like members, the two nose-like end portions being so arranged as to approach one another when the tool is actuated by displacing the handle members toward one another, and each attachable part forming a nose-like end portion being provided with two tips projecting outwardly from its end faces and arranged symmetrically with respect to a longitudinal center plane in such a manner that said end portions can be installed on the head section in two positions to selectively bring into use one tip and, after wear thereof, the other tip so as to extend the useful life of each attachable part.

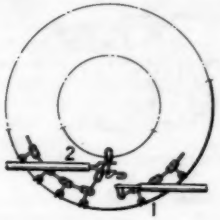


4,708,035

SNOW CHAINS FOR VEHICLES

Gad B. Artzi, 11 Jabotinsky Street, Hadera, Israel

Filed Jun. 18, 1986, Ser. No. 875,594
Int. Cl.[4] B60C *27/06*
U.S. Cl. 81—15.8 **1 Claim**



1. A device for use in placing and fixing snow chains onto the wheels of a vehicle where the snow chains have links at one end and hooks at the other end, said device comprises a first and a second U-shaped member, each said U-shaped member comprises a first leg and a second leg in laterally spaced relation with said first and second legs having a free end and a connected end, said free end of each of said first legs is bifurcated having a pair of laterally spaced tines, said free end of said second leg of said first U-shaped member being hollow and said free end of said second leg of said second U-shaped member having a reduced diameter compared to the remainder of said second leg so that said reduced diameter fits into the

hollow free end, when said reduced diameter second leg fits into said hollow free end of the other second leg and said U-shaped members are positioned for connecting the ends of the snow chains the tines of the first leg of said first U-shaped member are located in a plane extending transversely of a plane containing the tines of the first leg of said second U-shaped member, said tines of said first leg of said first U-shaped member having slits extending in the direction of said tines with said slits facing toward one another and said tines of said first leg of said second U-shaped member having slits extending in the direction of said tines with said slits facing away from one another whereby the slits in said tines in the first leg of said first U-shaped member are arranged to receive a link at one end of the snow chain and the slits in the tine in the first leg of the second U-shaped member are arranged to receive a hook and a link at the other end of the snow chain for interconnecting the link received by the first U-shaped member to the hook received by the second U-shaped member.

4,708,036

STUD TENSIONING APPARATUS

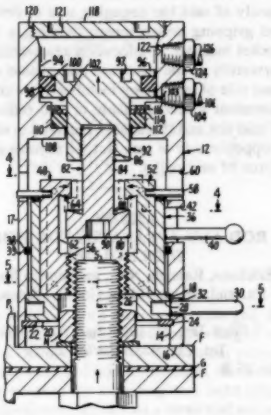
William J. H. Vossbrinck, Campbell, Calif., assignor to Haskel, Inc., Burbank, Calif.

Continuation of Ser. No. 577,819, Feb. 7, 1984, abandoned. This application Jun. 10, 1985, Ser. No. 742,995

The portion of the term of this patent subsequent to Aug. 12, 2003, has been disclaimed.

Int. Cl.[4] B25B *29/02*

U.S. Cl. 81—57.38 **25 Claims**



1. An apparatus for tensioning a threaded stud-like member with which a nut is engaged comprising a housing defining a cylindrical bore having a cross sectional dimension greater than the outside diameter of the stud and the nut, said housing having a plurality of elongated slots therein and a longitudinal extremity that defines a substantially annular surface transverse to said bore and adapted for engagement with a surface from which said stud-like member protrudes, a plurality of generally sector-shaped jaws having inner surfaces that define thread portions configured for engagement with the threads on the stud, each of said jaws being aligned with one of said elongated slots, a pin fixed to each said jaw and extending radially outward thereof through one of said slots, each said pin and slot serving to inhibit rotative movement of said jaw and to afford longitudinal movement thereof, means for supporting said jaws in said housing so that said inner surfaces are spaced substantially uniformly about said stud and define a substantially cylindrical opening for receiving said stud therethrough, said supporting means including an actuating sleeve defining an opening and circumscribing said jaws, said actuating sleeve having a cylindrical external surface that has a diameter less than the inside diameter of said bore so that said sleeve is rotatable relative to said housing, said sleeve having an inner surface that defines a plurality of cam surfaces equal in number to said jaws, each of said jaws having a portion extending beyond the longitudinal extremity of said actuating sleeve in a direction remote from said annular surface and a surface portion disposed radially outwardly of said threaded portion and adapted for cooperation with one of said cam surfaces, each said cam surface having a first inward extending region dimensioned to position a jaw contacted thereby in threaded engagement with the threads of said stud-like member, each said cam surface also having a second region circumferentially spaced from said first region and disposed radially outward thereof so that when said second region contacts a jaw said jaw is positioned radially outward of the stud threads, each said cam surface also having a transition region intermediate said first and second regions to effect radial movement of said jaws between an engaged position and an outward position in response to rotation of said actuating sleeve within said housing, means for selectively rotating said actuating sleeve, means for applying axial force to said jaws so as to apply tension to said stud-like member, means for preventing said jaws from rotating with said sleeve, and nut driving means for imparting rotation to said nut.

4,708,037

COATED CEMENTED CARBIDE TOOL FOR STEEL ROUGHING APPLICATIONS AND METHODS FOR MACHINING

Sergei-Tomislav V. Buljan, Acton; Helmut Lingertat, Dorchester; J. Gary Baldoni, II, Walpole, and Vinod K. Sarin, Lexington, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Conn.

Division of Ser. No. 799,088, Nov. 18, 1985. This application Dec. 19, 1986, Ser. No. 943,987

Int. Cl.[4] B23B *1/00, 27/14;* **B22F** *5/00;* **C22C** *29/00*

U.S. Cl. 82—1 C **2 Claims**

1. A method of rough cut machining steel comprising

turning a steel work piece on a lathe at an effective speed of up to about 275 surface feet per minute;

moving a coated cemented carbide cutting tool across the surface of said steel workpiece at a feed rate from about 0.01 to about 0.04 inches per revolution, said coated cemented carbide cutting tool consisting essentially of a densified body having tungsten carbide grains, metal carbide grains selected from the group consisting of TiC, TaC, NbC, HfC, and combinations thereof, and a bonding phase consisting essentially of cobalt; said tungsten carbide grains being equal to or greater than 70 weight percent of said densified body, said tungsten carbide grains having an average grain size from about 0.9 to about 1.3 microns, and less than 10 percent of said tungsten carbide grains having a size less than 0.5 microns; said cobalt being from about 5 to about 10 weight percent of said densified body and the remainder being said metal carbide grains; said densified body being coated with an adherent refractory coating layer; and

cutting said steel workpiece with said coated cemented carbide cutting tool to effect a depth of cut of about 0.125 to about 0.500 inches.

4,708,038

METHOD FOR MACHINING AND IMPROVED MODIFIED THREADED COLLAR

Dieter Hellnick, 8204 Fairbanks N. Houston, Houston, Tex. 77064; Karl J. Victor, 3660 Lake Aspen East Dr., Gretna, La. 70056, and Gregory K. Otten, One Shell Plaza, P.O. Box 2463, Houston, Tex. 77001

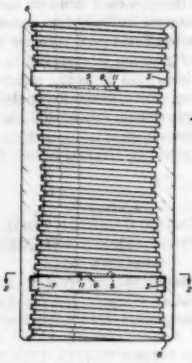
Filed Aug. 29, 1986, Ser. No. 901,626

Int. Cl.[4] B23C *1/00;* **B23G** *1/22;* **B65D** *59/00;* **F16L** *57/00*

U.S. Cl. 82—1 C **9 Claims**

3. A method for manufacturing an improved internally threaded and grooved member comprising:

a. setting a threading tool of a lathe a known initial distance from a face of a cylindrical member;
b. threading an area of said cylindrical member internally with said threading tool;
c. cutting an annular groove within the threaded area of said cylindrical member whereby tapered feather edges are formed on the threads forming a substantial portion of the walls of the anular groove;
d. operating a machining tool of said lathe to remove the feather edge thread on the side of the groove furthest from the face of the member;
e. determining the angular difference between the feather edge thread and the location of the cut made by said machining tool during said operating step;



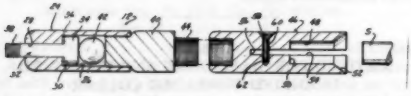
f. adjusting said known initial distance between said threading tool and the face of said cylindrical member to reduce the angular difference between the feather edge thread and the location of the cut made by said machining tool during said operating step to zero so that the location of the feather edge thread will be coincident with the location of the cut made by said machining tool during said operating step;
g. repeating said setting, threading, cutting, operating and determining steps on other cylindrical members after said adjusting step thereby manufacturing an improved internally threaded and grooved member with the feather edge thread removed.

4,708,039

BAR FEEDING APPARATUS

Robert J. Redman, Indian River, Mich., assignor to Tube Fab of Afton Corporation, Afton, Mich.

Filed Feb. 18, 1986, Ser. No. 830,111
Int. Cl.[4] B23B *13/00*; B23Q *5/22*
U.S. Cl. 82—2.5 **1 Claim**



1. In a bar feed apparatus for feeding elongate bar stock to a machine tool, said apparatus including reciprocable stock pusher means operable in a forward stroke to resiliently grip one end of a bar and longitudinally advance the bar in step-by-step movement to the tool, said pusher means being movable away from said tool in a return stroke to a bar receiving position wherein another elongate bar may be placed between said pusher means and said tool to be advanced to said tool by a subsequent forward stroke of said pusher means, and means operable during the return stroke of said pusher means for ejecting a bar remnant from said pusher means;

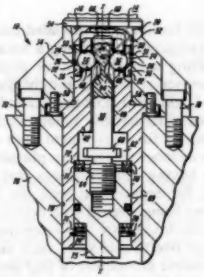
the improvement wherein said pusher means comprises a housing having a central passage extending longitudinally therethrough from front to rear, said passage having a relatively small diameter rear end portion and a relatively large diameter front end portion, a coupling member having a radially enlarged head seated at the rearward end of said front end portion of said passage and an integral shank extending rearwardly from said head through said rear end portion of said passage to project longitudinally from the rear of said housing, said coupling member and said housing being rotatable relative to each other about the longitudinal axis of said housing, a mounting member threadably mounted in the forward end of said front end portion of said passage, a bearing located in said passage and engaged between the rearward end of said mounting member and said head of said coupling member to maintain said head seated at said rearward end of said front end portion of said passage, a cylindrical article gripping socket member fixedly mounted on the forward end of said mounting member in coaxial relationship with the longitudinal axis of said housing, said socket member having a bar receiving axial bore extending rearwardly from the front end of said socket member to terminate at a flat bar end engaging seat and a diametral slot through said socket member extending axially rearwardly from the front end of said socket member to a location spaced rearwardly of said bar engaging seat to define a resilient bar end gripping collet, means defining a radial bore in said socket member at a location rearwardly of said seat and forwardly of the rearward end of said slot extending from one side of said socket member through said slot, and an adjustment screw rotatable in said radial bore at one side of said slot and threadably received in said radial bore at the opposite side of said slot for adjusting the bar gripping force of said collet.

4,708,040

LOCK ROD AND APPARATUS FOR HOLDING A TOOLHOLDER

Robert A. Erickson, Raleigh, N.C., assignor to Kennametal Inc., Latrobe, Pa. and Krupp Widia GmbH, Essen, Fed. Rep. of Germany

Filed Jan. 27, 1987, Ser. No. 7,169
Int. Cl.[4] B23B *29/04, 29/34*
U.S. Cl. 82—36 B **9 Claims**



5. An apparatus for holding a tubular toolholder shank, said apparatus comprising:

a tool support member having a forwardly facing surface and a bore intersecting said forwardly facing surface and extending rearwardly therefrom for receiving said shank;

a means for locking said toolholder shank into said tool support member;

said means for locking having a stub member having a passageway therein and a reciprocally movable element loosely engaged in said passageway;

said stub member located within said bore and receivable in said tubular toolholder shank;

said stub member having a first aperture and a second aperture circumferentially spaced from said first aperture;

said first and said second apertures radially extending away from the bore wall and intersecting said passageway;

a first locking element and a second locking element for releasable abutment with said hollow toolholder shank respectively located in said first and said second apertures;

a ramp and a groove for moving and releasably holding said locking elements against said hollow toolholder shank;

said ramp and said groove located on said reciprocally movable element, said groove extending parallel to a direction of the reciprocal movement of said reciprocally movable element, and said ramp and said groove respectively circumferentially aligned with said first and second apertures.

4,708,041

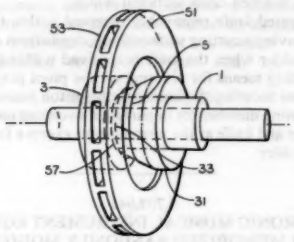
LATHE MOUNTING APPARATUS

Robert A. Granger, 1257 Britain Dr., Lawrenceville, Ga. 30245

Filed Aug. 26, 1986, Ser. No. 900,450

Int. Cl.[4] B23B *31/00, 33/00, 5/02*

U.S. Cl. 82—40 R **3 Claims**



1. A lathe mounting apparatus comprising:

a hollow cylindrical core having an enlarged cylindrical termination at one end thereof, said enlarged cylindrical termination defining a hollow cylindrical recess concentric with said core and said termination, the hollow of said core being adapted for mounting on a lathe spindle, and a hollow conical member having a small end and a large end slidably and matingly engaging said core with the small end thereof received within the hollow of said termination, whereby an article can be adjustably mounted between said termination and said conical member.

4,708,042

PUNCHING MACHINE

Klaus Jung, Pirmasens, Fed. Rep. of Germany, assignor to Schön & Cei, GmbH, Pirmasens, Fed. Rep. of Germany

Filed Apr. 28, 1986, Ser. No. 856,211

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1985, 3515112

Int. Cl.[4] B21D *28/34*

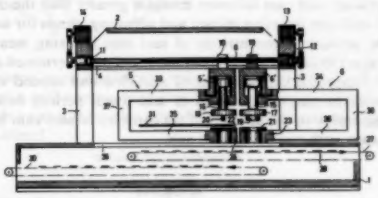
U.S. Cl. 83—112 **5 Claims**

1. A punching machine for punching a plurality of products having inner holes from a sheet of material, which is movable in a direction of advancement and which has a breadth transverse to such direction of advancement, across the entire breadth of the sheet of material, said machine comprising:

a rigid frame including a lower frame member and an upper frame member firmly connected together with a space therebetween, the sheet of material being moved through said space in the direction of advancement;

first and second punching carriages positioned in said space and mounted on said frame for movement relative thereto;

each said punching carriage having a U-shaped configuration including upper and lower legs joined by a connecting portion, a cylinder integral with a free end of said upper leg and movably receiving a piston supporting a punching tool, and an abutment integral with a free end of said lower leg and supporting a die plate complementary to said punching tool and precisely aligned therewith, the distance between the middle of said punching tool and the innermost surface of said connecting portion being equal substantially to the breadth of the sheet of material minus half the diameter of said punching tool, such that said



punching tool of each said punching carriage is movable over the entire breadth of the sheet of material;

said punching tool and die plate of said first punching carriage being dimensioned to punch the inner holes of the products to be punched from the sheet of material, and the punching tool and die plate of said second punching carriage being dimensioned to punch the outer contour of the products from the sheet of material; and

means for moving sequentially first said first punching carriage and then said second punching carriage, relative to said frame in a direction transverse to the direction of advancement of the sheet of material, to a plurality of predetermined punching positions at each of which first the inner hole of a product is punched and then the outer contour thereof is punched.

4,708,043

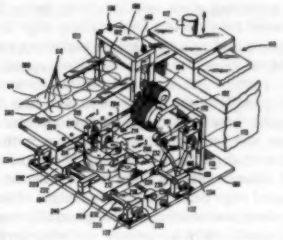
ADJUSTABLE CAM INDEXING FEED APPARATUS

Richard A. Greguoli, Meriden, Conn., assignor to The Cly-Del Manufacturing Company, Waterbury, Conn.

Filed Aug. 7, 1985, Ser. No. 763,446

Int. Cl.[4] B26D *5/20*

U.S. Cl. 83—219 **28 Claims**



1. An apparatus for indexing a strip comprising first and second cam follower means arranged for reciprocal displacement over a predetermined distance; connecting means for connecting said first and second cam follower means in spaced-apart relationship whereby the displacement of said first cam follower means causes displacement of said second cam fol-

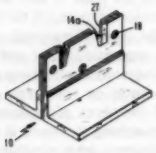
lower means; strip support means for supporting a strip to be indexed, said strip support means being coupled to said connecting means for movement in response to the displacement of said first and second cam follower means; cam indexing means eccentrically mounted for rotation about an axis between said first and second cam follower means, said cam indexing means reciprocally displacing said first and second cam follower means upon alternate engagement therewith during rotation of said cam indexing means about said axis, said connecting means maintaining the distance between said first and second cam follower means constant during the reciprocal displacement thereof over said predetermined distance, said distance between said first and second cam follower means being greater than the diameter of said cam indexing means whereby the indexing of said strip includes dwell periods whose duration are responsive to the amount said distance between said cam follower means is greater than the diameter of said cam indexing means; and adjusting means for adjusting the amount of eccentricity of said cam indexing means with respect to said axis to thereby vary said predetermined distance of reciprocal displacement of said first and second cam follower means, the duration of said dwell periods being non-responsive to the amount of eccentricity of said cam indexing means with respect to said axis.

4,708,044

KNIFE ASSEMBLY FOR CUTTING SAUSAGE CASINGS

John M. Adams, Atlanta, Ga., assignor to Atlas Casing Company, Inc., Fairburn, Ga.

Filed Jul. 1, 1986, Ser. No. 881,173
Int. Cl.[4] A22B *5/00*
U.S. Cl. 83—545 **14 Claims**



1. A cutting device, comprising:

(a) a generally circular shaped knife having a peripheral cutting edge;

(b) means for mounting said knife in a cutting position, said mounting means including a first mounting plate portion having an upwardly directed edge formed with a groove into which extends a part of said cutting edge; and

(c) means for attaching said knife in stationary position to said mounting plate, said attaching means being movable to enable rotation of a fresh cutting edge into the groove;

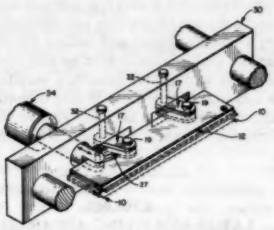
(d) wherein said mounting means includes a pair of generally L-shaped mounting plates each having said first mounting plate portion and a second portion formed substantially orthogonally to the first portion, said first mounting plate portions thereof sandwiching said circular knife therebetween and being connected together with screw means, said second portions extending in opposite directions to each other to define a support base wherein said upwardly directed edge defined by the top edges of said first mounting plate portions includes a generally centrally located first substantially horizontal top edge terminating in an inclined wall defining a first surface of said groove, said upwardly directed edge further including a laterally located second substantially horizontal top edge spaced from the first horizontal top edge via said groove, said second horizontal top edge terminating in a second wall defining a second surface of said groove extending downwardly to intersect said first surface at the bottom of said groove, said cutting edge extending through the groove below the top and bottom thereof.

4,708,045

REPLACEABLE KNIFE AND HOLDER

John L. Posey, McHenry, and Josef Schmidt, Libertyville, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jan. 13, 1986, Ser. No. 818,166
Int. Cl.[4] B26B *5/00*; B26D *1/45, 7/10*
U.S. Cl. 83—604 **12 Claims**



1. An apparatus for severing a web of film comprising:

a holder mountable to a reciprocating jaw including means for securing the holder to the reciprocating jaw and a channel having at a first end a pivot pin and at a second end a reduced cross-sectional width;

an elongated knife removably received within the channel and having a cutting surface that extends from a bottom of the holder when the knife is received within the channel including means for pivoting on the pivot pin; and

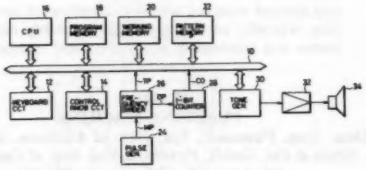
the means securing the holder to the piston means including a pivoting member for imparting a sweeping motion to the holder and knife as the piston means exerts a force against the holder.

4,708,046

ELECTRONIC MUSICAL INSTRUMENT EQUIPPED WITH MEMORIZED RANDOMLY MODIFIABLE ACCOMPANIMENT PATTERNS

Koichi Kozuki, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Shizuoka, Japan

Filed Dec. 23, 1986, Ser. No. 945,843
Claims priority, application Japan, Dec. 27, 1985, 60-293944
Int. Cl.[4] G10H *1/36, 7/00*
U.S. Cl. 84—1.03 **2 Claims**



1. An electronic musical instrument performing automatic accompaniment on memorized patterns, comprising:

memory means storing a set of sequentially aligned accompaniment data constituting an accompaniment pattern;

reading-out means connected to said memory means to successively read out, at given pulse timings, said accompaniment data from said memory means;

judging means connected to said reading-out means to judge, at each time said accompaniment data are read out, whether each of said data indicates a specific value;

random signal generating means successively generating output signals independently of the accompaniment data reading-out timings and in different values with time for each output signal;

accompaniment data contents determining means connected to said judging means and to said random signal generating means to determine the contents of the accompaniment data which can differ depending on the value of the signal outputted from said random signal generator just when the read-out accompaniment data indicates a predetermined specific value;

accompaniment tone generation control means connected to all of said reading-out means, said judging means and said contents determining means to be able to determine the generation of accompaniment tones in accordance with the read-out accompaniment data not judged as indicating a specific value, and also to be able to determine the generation of accompaniment tones based on the accompaniment data supplied from said contents determining means when the read-out accompaniment data is judged as indicating a specific value; and

an accompaniment keyboard connected to said accompaniment tone generation control means to control generation of accompaniment tone as instructed by said control means based on a key depression information supplied from said keyboard.

4,708,047

PAD CUPS FOR A WOOD WIND

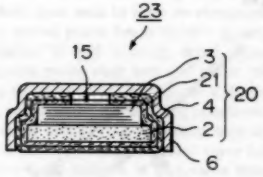
Kyoetsu Kanazawa, and Mitsuo Ono, both of Shizuoka, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Apr. 21, 1986, Ser. No. 854,040

Claims priority, application Japan, Apr. 24, 1985, 60-060191[U]

Int. Cl.⁴ G10D *9/04*

U.S. Cl. 84—385 P **9 Claims**



1. An improved pad cup for a wood wind, comprising:

a cup having an open end; and

a pad located in said cup, said pad including: a flexible, air pervious core; a flexible, resilient, air impervious layer covering said core in the area of said open end of said cup; and a skin bag covering both said core and said air impervious layer.

4,708,048

MUNITIONS ASSEMBLY SYSTEM

Wallace L. Brown, Guntersville, Ala., and O. Mark Madamba, Fort Walton Beach, Fla., assignors to Ver-Val Enterprises, Inc., Fort Walton Beach, Fla.

Filed May 14, 1986, Ser. No. 862,995

Int. Cl.⁴ F41F *3/04*

U.S. Cl. 89—1.805 **17 Claims**

1. A munitions assembly system comprising:

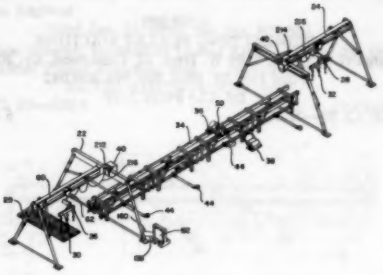
an on-load gantry;

an off-load gantry;

hoisting means attached to each of said gantries;

conveyor means extending between the on-load gantry and an off-load gantry;

a plurality of transport means which travel on said conveyor means; and



an arming wire dispenser located adjacent said conveyor means, said arming wire dispenser supplying arming wire from a spool through a straightening tube to a munition to be armed.

4,708,049

AUTOMATIC FIRE ARM WITH EXTERNAL MOTOR

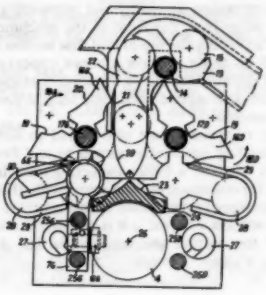
Jacques Durant, Bourges; Georges Simon, Saint-Germain Du Puy, and Alain Charton, Bourges, all of France, assignors to Etat Francais, France

Filed Mar. 25, 1986, Ser. No. 855,159

Claims priority, application France, Mar. 26, 1985, 85 04450

Int. Cl.⁴ F41D *3/06, 10/28, 10/06*

U.S. Cl. 89—11 **5 Claims**



1. An automatic firearm of a type including a feed system, comprising:

a rotatable drum driven in rotation by an outer motor, said drum including a closed contour breech drive ramp;

first and second follower members cooperating with said ramp, each said follower member being rigidly mounted to a breech associated with a cartridge chamber to impart to each said breech a reciprocating movement between a feed position where it is separated from its respective cartridge chamber and a firing position where it closes said respective cartridge chamber;

feed means, including continuously rotating dispensing means and distribution means, said distribution means respectively including first and second intermittently rotating means respectively associated with said breeches;

whereby said first and second intermittently rotating means cooperate with said follower members, said rotatable drum and said dispensing means, such that ammunition is dispensed from said dispensing means to said intermittently rotating means when said intermittently rotating means are not rotating, and said ammunition is supplied

from said intermittently rotating means to their respective breeches when said respective intermittently rotating means are rotating.

4,708,050

REDIRECTING BULLET MACHINE

Ralph G. Hoskins, 6609 W. Hwy. 22, Crestwood, Ky. 40014

Filed Feb. 18, 1986, Ser. No. 834,042

Int. Cl.[4] F41H *5/24*

U.S. Cl. 89—36.04 **6 Claims**

1. A bullet redirecting machine comprising:

back plate means having first and second sections, said first section extending upwardly and rearwardly from bottom to top, away from the front of the machine, said second section adjoining the top of said first section and returning through an angle to form a curve concavely facing the front of the machine and, a top section extending horizontally from said second back plate section toward the front of the machine;

a plurality of spaced apart ribs affixed to said first section and extending outwardly normal to said first and second sections whereby a bullet impacting said first back plate section travels upwardly and rearwardly therealong channeled between two adjacent of said plurality of ribs to said second section whereat it is redirected through the curve to said top section and returned in the direction from whence it came.

4,708,051

SHELL LAUNCHING ASSEMBLY

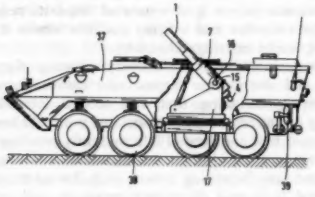
Gideon Argon, Tel-Aviv, Israel, assignor to Salgad International Ltd., Cayman Insel, Jamaica

Filed Aug. 18, 1986, Ser. No. 897,516

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1986, 3603624

Int. Cl.[4] F41F *19/02*

U.S. Cl. 89—40.02 **17 Claims**



1. A shell launching assembly including a projector barrel having a smooth, inner wall and an upper end into which a shell is loaded by insertion from above, said assembly comprising:

(a) an ignition mechanism disposed in a lower end of the barrel closed by cap means, and

(b) mounting means for supporting the projector barrel in a variable tilted position,

(c) said mounting means including recoil brake means concentrically mounted with respect to the projector barrel to cushion the recoil of the projector barrel from a starting position to a recoil position upon firing a shell therefrom,

(d) said projector barrel being removably disposed with respect to the recoil brake means so that the barrel may be independently used apart from the launching assembly,

(e) the cap means including a closure cap member fixed to the lower end of the barrel and attaching means cooperating with the closure cap member to removably secure the projector barrel to the recoil brake means,

(f) the closure cap member having flange means extending outwardly therefrom,

(g) the attaching means including a clamping collar member to engage the recoil brake means and to contact said flange means for securing the projector barrel when the collar member is engaged to said recoil brake means,

(h) said mounting means including cradle means having bearings which receive transverse pivot pins located on the recoil brake means, and

(i) said cradle means being fixedly located in a vehicle.

4,708,052

HEIGHT ADJUSTMENT APPARATUS FOR THE FIRING BARREL OF A SHELL LAUNCHER

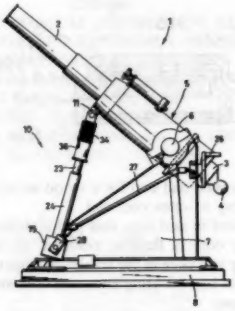
Gideon Argon, Tel-Aviv, Israel, assignor to Salgad International Ltd., Cayman Insel, Jamaica

Filed Aug. 18, 1986, Ser. No. 897,496

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1986, 3603623

Int. Cl.[4] F41F *21/04*

U.S. Cl. 89—41.01 **19 Claims**



1. Height adjustment apparatus for the firing barrel of a shell launcher, said apparatus comprising:

(a) means mounting a firing barrel to pivot about an axis of rotation for movement to various tilt positions, and

(b) support means pivotally connected at a point along the firing barrel and laterally displaced from the axis of rotation,

(c) said support means including an upper support section, a lower support, and joint means for pivotally moving the upper support section between a locked, extended rest position and a bent position with respect to the lower support section,

(d) said firing barrel being in a firing position when the upper support is in the locked, extended rest position and in a

stored position when the upper support section is in bent position,

(e) said joint means including means for locking the upper support section in said locked rest position,

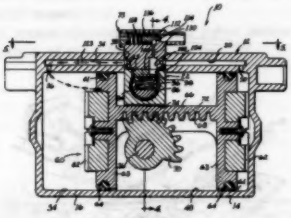
(f) said locking means being releasable to quickly change the angular position of the firing barrel to a stored position.

4,708,053

RECIPROCATING PISTON FLUID POWERED MOTOR

Alan K. Forsythe, Tukwila, Wash., and Richard J. Frigon, Michigan City, Ind., assignors to Sprague Devices, Inc., Michigan City, Indiana

Continuation-in-part of Ser. No. 623,080, Jun. 21, 1984, Pat. No. 4,632,013. This application Nov. 13, 1985, Ser. No. 797,506
The portion of the term of this patent subsequent to Dec. 30, 2003, has been disclaimed.
Int. Cl.[4] F01L *25/02*
U.S. Cl. 91—284 4 Claims



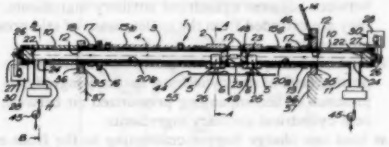
1. In an oscillatory fluid powered motor including a motor housing formed of two similar cup-shaped parts secured together at their open ends to form an elongated bore, a piston unit having spaced piston heads slidable in said bore, a motor shaft journalled in said housing, drive transmission means connecting said motor shaft and said piston unit for rotationally driving the motor shaft in response to linear motion of the piston unit, said housing parts having complementary passages therein, a valve unit having a housing secured to and transverse of said motor housing bore, said valve housing having a bore, a valve spool slidable in said valve housing bore, said valve housing having passages communicating with said motor housing passages, the improvement comprising a manifold mounted in said valve housing and having a flat face, said manifold having passages formed therein communicating with said motor housing passages, said manifold having a fluid inlet and a fluid outlet, said valve housing having a cavity for communication between said inlet and said valve housing bore, a valve slide mounted in and slidable with said valve spool and fitting within said cavity, said valve slide having a face in sliding contact with a face of said manifold, a face of said valve slide having a passage for selectively connecting said manifold and housing passages with said inlet and said outlet, said manifold passages being so arranged and communicating with said motor housing passages that said valve slide and said piston unit are caused to reciprocate in response to fluid pressure supplied at said inlet, and valve means adjustably positioned adjacent said fluid outlet for exhausting air from said valve spool through said outlet, said valve means including an exhaust port in flow communication with a said valve spool passage, a needle valve slidable in said exhaust port, a cap adjustably positioned in said exhaust port spaced from said needle valve, and resilient means for urging said needle valve towards an outlet flow restricting position in said exhaust port.

4,708,054

CREAMING APPARATUS

Desmond Newbery, and Terry A. Pickford, both of Peterborough, England, assignors to Baker Perkins PLC, Cambridgeshire, England

Filed Jan. 22, 1986, Ser. No. 821,382
Claims priority, application United Kingdom, Jan. 22, 1985, 60-0-1556; United Kingdom, Nov. 7, 1985, 27457
Int. Cl.[4] A21C *9/04*; B29F *3/01*
U.S. Cl. 99—450.4 12 Claims



1. A creaming apparatus, comprising:

a stencil member having at least one cream discharge orifice; and,

cream channeling means moveable between: a creaming position, wherein cream is discharged downwardly from the at least one orifice for application to products passing beneath the stencil member; and, an air purging position, wherein cream is discharged at an angle from vertical from the at least one orifice for collection at a position to one side of the stencil member,

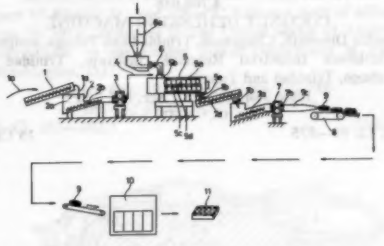
whereby cream discharged during air purging may be easily collected for reuse.

4,708,055

APPARATUS FOR CONTINUOUSLY PROCESSING FISH FLESH

Tadao Matsumoto, Kanagawa, and Sunao Inazuma, Tokyo, both of Japan, assignors to Nippon Suisan Kaisha, Ltd., Tokyo, Japan

Filed Mar. 27, 1986, Ser. No. 845,224
Claims priority, application Japan, Apr. 11, 1985, 60-78039
Int. Cl.[4] A22C *25/00*; A23B *4/06*
U.S. Cl. 99—484 1 Claim



1. An apparatus for continuously processing fish comprising:

a first continuous force-out feeder having a front end and a rear end, means for continuously feeding dewatered fish flesh, obtained by removal of skin, bone and other undesirable matters and dewatering, to the rear end of said first force-out feeder so that the fish flesh is further dewatered as the fish flesh proceeds through the first feeder toward the front end, a first extruding means connected to the front end of said first force-out feeder for continuosly extruding the dewatered fish flesh in a pressurized state a continuous kneader connected to the first extruding means, in which said dewatered fish flesh is kneaded and incorporated with a mixture of auxiliary ingredients comprising sugar and sorbitol in predetermined quantities to obtain surimi paste and from which the surimi paste is continuously discharged; an auxiliary ingredient pressure adding device for adding said mixture to said continuous kneader; a second con-

tinuous force-out feeder connected to said kneader for continuously forcing out said continuously discharged surimi paste to a second extruding means for extruding said surimi paste as a continuum; a continuous packer for continuously packing surimi blocks after cutting said continuum of surimi paste into blocks having predetermined quantities; and a freezer for freezing said packed surimi blocks characterized in that said auxiliary ingredient pressure adding device comprises:

at least one auxiliary ingredient pressurizing means in which each of said auxiliary ingredients is shaped into cylindrical form and in the presence of accompanying pressurized air between adjacent cylindrical auxiliary ingredients, while they are extruded from the outlet means of said pressurizing means;

at least one transport conduit means for pneumatically transporting each of said cylindrical auxiliary ingredients in the presence of accompanying pressurized air between adjacent cylindrical auxiliary ingredients;

at least one charge hopper connecting to the front end of said transport conduit means to collect each of said cylindrical auxiliary ingredients after removal of said accompanying pressurized air between said cylindrical auxiliary ingredients;

at least one meter connecting to the outlet means of said charge hopper to measure each of said auxiliary ingredients in predetermined quantities;

a mixer for mixing each of said measured auxiliary ingredients to form a mixture of auxiliary ingredients;

a pressurizing device connected to said mixer for shaping said mixture into a cylindrical form and with accompanying pressurized air between adjacent cylindrical mixtures while it is extruded from the outlet means of said pressurizing device in a pressurized state;

transport conduit means connected to said pressurizing device for pneumatically transporting said auxiliary cylindrical mixtures in the presence of accompanying pressurized air between adjacent axuiliary cylindrical mixtures, and

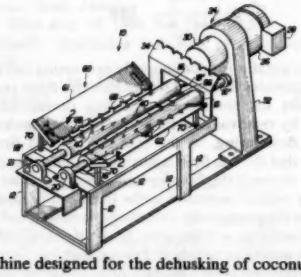
charge hoppers connecting to the front end of said transport conduit means to collect said auxiliary cylindrical mixtures after removal of said accompanying pressurized air between adjacent cylindrical mixtures.

4,708,056

COCONUT DEHUSKING MACHINE

Chandra Dinanath, Chaguanas, Trinidad and Tobago, assignor to Caribbean Industrial Research Institute, Trinidad and Tabago, Trinidad and Tobago

Filed Jan. 28, 1987, Ser. No. 7,805
Int. Cl.[4] A23N *5/00*
U.S. Cl. 99—575 **15 Claims**



1. A machine designed for the dehusking of coconuts, comprising:

(a) a base structured for positioning and support on a supporting surface,

(b) at least two rollers each having an elongated configuration and being rotatably mounted on said base in spaced, parallel relation to one another,

(c) penetration means formed on each of said rollers for penetrating the husk of a coconut engaging said rollers,

(d) said penetration means comprising a plurality of sharpened spikes secured to and protruding outwardly from an outer surface of each of said rollers,

(e) said plurality of spikes disposed in a patterned array extending along at least a majority of the length of each roller,

(f) drive means interconnected to said two rollers for forced rotation thereof, said drive means structured to concurrently rotate said rollers in opposite directions, and

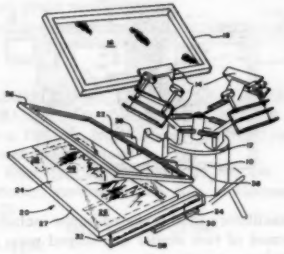
(g) clearing means mounted on said base in immediately adjacent and spaced relation to each of said rollers for cleaning husks from said rollers and said penetration means.

4,708,057

PLATEN ASSEMBLY FOR SCREEN PRINTING

Tad C. Hogenson, West Jordan, Utah, assignor to T. Parker Distributing Company, Inc., Sandy, Utah

Filed Apr. 23, 1986, Ser. No. 855,252
Int. Cl.[4] B41M *1/12*
U.S. Cl. 101—129 **22 Claims**



1. A method of aligning and printing meeting designs on items to be printed, comprising the steps of printing the first design on the item to be printed wherein said printed design extends to an edge of the item where it is to meet with a second design to be printed; placing the item on a printing platen with the first design against the platen and the edge of the item where the second design is to meet the first design positioned over a light transmitting portion of the platen; allowing light to be transmitted through the light transmitting portion of the platen to thereby show the position of the first design at the edge of the item where the designs are to meet; positioning the item on the platen so that the second design to be printed will properly meet the first design at the edge of the item; and printing the second design on the item.

4,708,058

WATER PULSE SPRAY DAMPENING SYSTEM AND METHOD FOR PRINTING PRESSES

Gary R. Smith, Bucyrus, Kans., assignor to Smith RPM Corporation, Overland Park, Kans.

Continuation-in-part of Ser. No. 785,967, Oct. 10, 1985, abandoned. This application Jun. 20, 1986, Ser. No. 876,929
Int. Cl.[4] B41F *7/30, 7/26*
U.S. Cl. 101—147 **21 Claims**

1. In a lithographic press having a rotatable cylinder, a lithographic plate mounted on said cylinder and having at least one ink receptive area, and means for providing ink to said at least one ink respective area of said plate, a dampening system for delivering ink-repellant dampening fluid to said plate comprising:

a first roller in rolling engagement with said plate and having

a flexible surface with a Shore A durometer hardness of 25 to 40;

a second roller in rolling contact with said first roller and having an outer surface selected from the group consisting of chromium, nickel and ebonite;

a third roller in rolling engagement with said second roller and having a flexible surface with a Shore A durometer hardness of 25 to 40;

said first roller and said second roller presenting a first nip therebetween and said second roller and said third roller presenting a second nip therebetween,

said first roller, said second roller and said third roller being spaced from said means for providing ink to said plate for generally precluding the entry of substantial quantities of ink into said dampening system,

each of said surfaces of said first, second and third rollers causing respective rollers to be driven at essentially the same speed of rollers in contact with each of said surfaces;

a supply of dampening fluid pressurized to approximately 30 psi to approximately 60 psi;

conduit means coupled with siad fluid supply;

a plurality of nozzles coupled with said conduit means for spraying dampening fluid toward said third roller;

valve means associated with said conduit means and operable to interrupt the flow of dampening fluid through said conduit means; and

control means connected to said valve means for selective operation of the latter,

said control means being operable to enable flow of said fluid from said conduit through said nozzles during a pulse of time having a duration ranging from approximately 5 milliseconds to approximately 75 milliseconds,

said control means being operable to provide a series of said pulses having a frequency ranging from approximately 50 pulses per minute to approximately 600 pulses per minute at full press speed,

said nozzles being spaced apart from each other a distance in the range of approximately 4 inches to 10 inches,

said nozzles being spaced from said third roller a distance in the range of approximately 2 inches to approximately 4 inches,

said spacing of said nozzles relative to each other and said spacing of said nozzles relative to said third roller being such that the pattern of spray on said third roller provided by each nozzle overlaps the pattern of spray on said third roller provided by adjacent nozzles for substantially uniform distribution of said dampening fluid to said third roller along essentially the entire length of said third roller and to provide even transfer of said dampening fluid from said third roller to said second and first rollers and thereby to said plate as said dampening fluid is metered through said first nip between said first and second roller and through said second nip between said second and third roller.

4,708,059

INKING UNIT FOR ROTARY PRINTING MACHINES

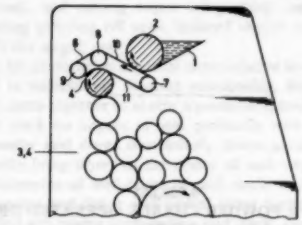
Rudi Jünghans, Wilhelmsfeld, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Sep. 3, 1986, Ser. No. 903,264

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1985, 3531433

Int. Cl.[4] B41F *31/06, 31/16*

U.S. Cl. 101—350 **6 Claims**



1. Inking unit for a rotary printing machine having an ink duct, a relatively slowly rotating ink duct roller and following form and distributor rollers rotating at the same peripheral speed as that of a plate cylinder of the printing machine, comprising an endless ink transfer belt located downstream from the ink duct roller in transfer direction of ink from the ink duct, and guide rollers engaging and guiding said endless ink transfer belt, said endless ink transfer belt extending laterally across the length of the ink duct roller and having one run thereof engaging the outer cylindrical surface of the ink duct roller at a location of said one run distant from any of said guide rollers, the other run of said endless ink transfer belt, at a location of the other run also distant from any of said guide rollers, engaging the outer cylindrical surface of the next distributor roller disposed downstream from said endless ink transfer belt.

4,708,060

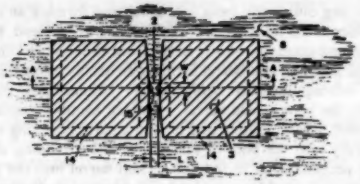
SEMICONDUCTOR BRIDGE (SCB) IGNITER

Robert W. Bickes, Jr., and Alfred C. Schwarz, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 19, 1985, Ser. No. 702,716

Int. Cl.[4] F42B *3/12*; F42C *19/12*

U.S. Cl. 102—202.7 **11 Claims**



1. An explosive device comprising:

a non electrically conducting substrate;

an electrical material mounted on said substrate and having a negative temperature coefficient of electrical resistivity at an elevated temperature, said material covering an area of said substrate and defining a pair of spaced pads connected by a bridge, the area of each of said pads being

much larger than the area of said bridge, the resistance of said bridge being less than about three ohms;

a metallized layer covering each of said spaced pads;

an electrical conductor connected to each of said metallized layers, whereby the electrical resistance between said electrical conductors is substantially determined by the electrical resistance of said bridge; and

an explosive material covering said device, the area of said bridge in contact with said explosive material being sufficient to ignite said explosive material when said bridge forms a plasma due to electrical current passing therethrough.

4,708,061

EXPLOSIVE POWDER CHARGE OPERATED DRIVING DEVICE

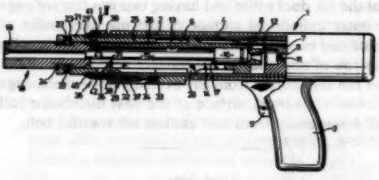
Franz Büechel, Ruggel/Liechtensteiner, Liechtenstein, assignor to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

Filed Feb. 19, 1987, Ser. No. 16,655

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1986, 3605832

Int. Cl.[4] F42B *13/44*

U.S. Cl. 102—331 **5 Claims**



1. Explosive powder charge operated device for driving fastening elements in a driving direction into a receiving material comprises a housing having a front end and a rear end with the front end-rear end direction corresponding to the driving direction of said device, an axially elongated driving member axially displaceably mounted within said housing and having a front end and a rear end spaced apart in the axial direction thereof, said driving member comprising an axially extending shank extending from the front end thereof toward the rear end and a head at the rear end thereof connected to said shank and projecting outwardly from said shank and forming an annular shoulder at the transistion from the shank to the head, a barrel within and extending axially in the front end-rear end direction of said housing, said barrel forming an axially elongated bore, said driving member being axially displaceably mounted within the bore in said barrel, a locking member displaceably mounted in said housing and having a part projecting radially inwardly into the bore in said barrel and extending substantially perpendicular to the axis of said barrel into the path of said annular shoulder of said driving member, a retaining member mounted on and extending around said housing and having a support shoulder in overlapping engagement with said locking member and holding said locking member in said housing, wherein the improvement comprising that said retaining member is displaceable on said housing in the circumferential direction around said driving member and said support shoulder extends in the circumferential direction around the axis of said driving member at least along a portion of said retaining member.

4,708,062

ARMING DEVICE FOR SEA MINES

Jan Björk, Rödhakegatan 2, S-260 23 KÅgeröd, and Sven G. Svensson, Ängagatan 8, S-261 39 Landskrona, both of Sweden

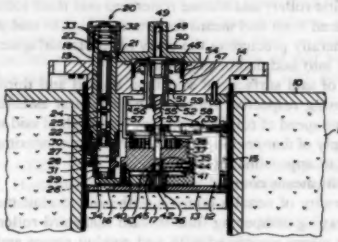
Continuation of Ser. No. 619,220, filed as PCT SE83/00352, Oct. 13, 1983, published as WO84/01619, Apr. 26, 1984 abandoned.

This applic..ion Mar. 24, 1986, Ser. No. 843,320

Claims priority, application Sweden, Oct. 15, 1982, 8205855

Int. Cl.[4] F42C *15/10*

U.S. Cl. 102—420 **17 Claims**



1. An arming device for sea mines, comprising an electric detonator; a transfer charge; and an interruptor which can be inserted between the detonator and the transfer charge, for separating the detonator and the transfer charge; the detonator being arranged as part of a separate unit shaped to be inserted in a space in a housing arranged in the arming device; the separate unit having a telescopic element, with a spring engaged with the telescopic element for pressing the detonator towards the interruptor; and cooperating electric contacts arranged on the unit and in the space, respectively, for the electric connection of the detonator upon insertion in the space.

4,708,063

PROJECTILES INTENDED TO BE FIRED BY A FIRE-ARM

Serge Ladriere, Avenue du Cap Roux, 06360 Eze-sur-Mer, France

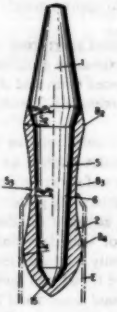
PCT No. PCT/FR83/00228, § 371 Date Jul. 18, 1984, § 102(e) Date Jul. 18, 1984, PCT Pub. No. WO84/02183, PCT Pub. Date Jun. 7, 1984

Continuation of Ser. No. 634,103, Jul. 18, 1984. This PCT application Nov. 24, 1983, Ser. No. 878,503

Claims priority, application France, Nov. 24, 1982, 82 19658; Dec. 14, 1982, 82 20907; Jun. 15, 1983, 83 09895

Int. Cl.[4] F42B *11/14*

U.S. Cl. 102—516 **10 Claims**



1. A unitary armor-penetrating projectile intended to be fired at a high velocity by a fire-arm having a rifled barrel, consisting of:

a central core constituting the effective portion of the projectile and having a smooth nose and a frusto-conical rear end decreasing in diameter from a front to a rear, said central core being made of an armor-penetrating material;

a one-piece rear body constituting a rifling engaging jacket around said rear end of said central core said jacket being formed of a single rifling engaging material which is softer than the armor-penetrating material, said rear body having

(a) a central frusto-conical bore along substantially all its length which bore decreases in diameter from a front of said rear body to an abutment surface in said rear body at a bottom of said bore, the dimensions and angles of said frusto-conical rear end and of said frusto-conical bore being essentially identical for allowing a tight penetration of said rear end into said bore and a relative self-tightening between said frusto-conical rear end of said central core and said frusto-conical bore of said rear body after firing of the projectile in the firearm due to the relative axial and rotational movement of said central core and said rear body produced by a firing, and

(b) at least two peripheral swellings having outermost portions cooperating with the riflings of the barrel and at least one peripheral hollow therebetween, said swellings and hollow being joined progressively together so as to define a continuous sinuous shape, the thickness of said rear body at said outermost portions being sufficient to prevent said central core from contacting the rifle barrel during firing; and

abutment means provided at the rear of said central core for axially abutting said central core in said bore to said abutment surface of said rear body.

4,708,064

IMPACT PROJECTILE

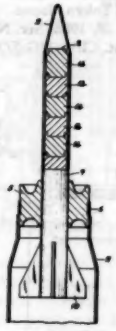
Bernhard Bisping, Ratingen-Hösel; Klaus Gersbach, Willich, and Rudolf Romer, Kaarst, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Dusseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 949,067, Sep. 5, 1978, abandoned. This application Aug. 23, 1982, Ser. No. 412,794

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1977, 2743732

Int. Cl.⁴ F42B *11/00*

U.S. Cl. 102—517 **5 Claims**



1. A weapon round effective for multiple and structured targets, comprising:

a propellant-containing casing and a subcaliber sagittate inertial impact projectile received in said casing and adapted to be fired through a barrel of a weapon, said subcaliber projectile comprising:

an elongated projectile body;

means on said body releasable therefrom and adapted to form a drive cage in said barrel;

means forming a tip at a forward end of said body; and

flight-path stabilizing means on a rear end of said body for directing said body toward a target, said body comprising:

an armor-breaking stack of a multiplicity of partial cores each provided with a respective cutting edge turned toward said forward end, said cores all being composed of metal and having a cylindrical configuration, all of said cores being of equal diameter and having planar separating surfaces along which the respective cutting edges are formed, said cutting edges being sharp circular edges limiting glancing off upon inclined impact of said cores with the target; and

means for centering said partial cores relative to one another and in successively abutting relationship, and for fixing said cores together to enable separation of said cores from said stack on impact of said projectile with said target whereby said cores successively pierce successively inwardly lying layers of the armor of said target, and for replacement of said cores in said stack, said means for centering and fixing said partial cores including a thin-walled soft casing surrounding said stack, and a cylindrical boss of each core received within a thin outer collar of an adjacent core, said collars carrying said cutting edges.

4,708,065

FULL CALIBER TRAINING PROJECTILE

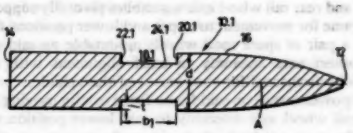
Hartmut Schilling, Kaarst; Helmuth Peller, and Hansjoerg Becker, both of Duesseldorf, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Mar. 8, 1985, Ser. No. 709,507

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1984, 3408476

Int. Cl.⁴ F42B *9/20*

U.S. Cl. 102—529 **2 Claims**



1. An improved full caliber, training projectile body of reduced range to be fired, said projectile body having at least one annular recess means coaxially arranged with respect to the longitudinal axis of the projectile body, the shape of said projectile body corresponds, with the exception of the annular recess means, to that of a conventional live reference ammunition unit of the same caliber as said projectile body; the improvement comprising

said annular recess means in the projectile body having a radial depth t which is equal to about 1/5 to ¼ of the caliber of the training projectile;

each one of said annular recesses means having a width b, the ratio of the depth t to the width b of the annular recess means ranges between 0.1 to 0.5, so that the position of the center of gravity of the training projectile corresponds substantially to that of a conventional full caliber projectile;

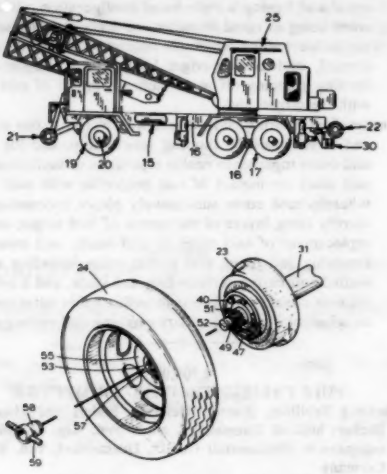
whereby without influencing the spin of the training projectile a predetermined reduction in the range of the training projectile is achieved, and the air streaming conditions caused by said annular recess means during flight is such that a flat trajectory of the training projectile is achieved which substantially corresponds in its initial flight path to that of the live reference ammunition.

4,708,066

COMBINATION RAIL AND HIGHWAY VEHICLE

Glenard W. Heckman, Des Moines, Iowa, assignor to Little Giant Crane and Shovel, Inc., Des Moines, Iowa

Filed Dec. 27, 1985, Ser. No. 813,699
Int. Cl.[4] B60F 1/00
U.S. Cl. 105—215.2 6 Claims



1. For use in a combination self-propelled highway and rail vehicle having a main frame, front and rear road wheel axle assemblies secured to the frame and wherein the rear road wheels are used for road and rail travel of the vehicle, and front and rear rail wheel axle assemblies pivotally supported on the frame for movement to upper and lower positions therefor:

(a) a pair of spare road wheels mountable on said rear rail wheel axle assembly in axial alignment with the rail wheels thereof for road travel of the vehicle,

(b) power means on said frame for pivotally moving the rear rail wheel axle assembly to said lower position wherein the spare road wheels are in road engagement, and

(c) means for applying a predetermined pressure on the road engaged spare road wheels by said power means to vary the axle loads on said front and rear road wheel axle assemblies.

4,708,067

METHOD OF CATALYSTLESS DENITRIFICATION FOR FLUIDIZED BED INCINERATORS

Minoru Narisoko, Matsudo, and Satoshi Inoue, Asaka, both of Japan, assignors to Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan

Filed Dec. 16, 1986, Ser. No. 942,135
Claims priority, application Japan, Jan. 22, 1986, 61-10228
Int. Cl.[4] F23D 1/00; F23G 5/00
U.S. Cl. 110—245 4 Claims

1. A method of catalystless denitrification for a fluidized bed incinerator, comprising the steps of:

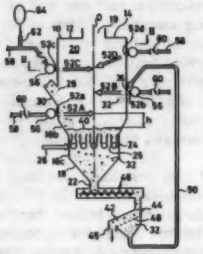
(a) forming a fluidized bed in the incinerator by fluidizing the substances to be incinerated and an incombustible fluidizing medium as the substances and the fluidizing medium are supplied to the fluidizing bed along with primary air, the primary air being blown into the fluidized bed by air diffuser tubes provided in the lower part of the incinerator, the air diffuser tubes extending generally parallel to each other;

(b) burning the substances in the fluidized bed, the burning of the substances resulting in the generation of combustible pyrolysis gases;

(c) forming a downward flow of the combination of the combustion residue of the substances to be incinerated and the fluidizing medium inside the fluidized bed through the air diffuser tubes, and discharging said combination from the bottom of said incinerator;

(d) separating the fluidizing medium from the combustion residue in a sieve, and then recirculating the separated fluidizing medium to the fluidized bed;

(e) combusting the combustible pyrolysis gases in the incinerator by blowing secondary air into a portion of the incinerator above the fluidized bed, the secondary air being blown into the portion of the incinerator from opposite sides of the incinerator along a plurality of parallel paths defining a lattice arrangement and from at least one upper stage and one lower stage in the incinerator; and,



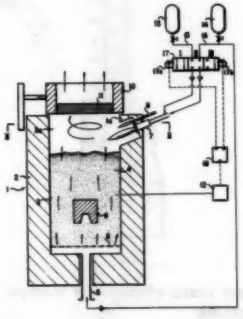
(f) performing denitrification of said combustible pyrolysis gas by mixing a gaseous denitrification agent with a portion of the secondary air which is introduced into the incinerator through said upper stage to react the agent with the nitrogen oxides present in the combustible pyrolysis gas within the incinerator.

4,708,068

FLUIDIZED-BED INCINERATION EQUIPMENT FOR REMOVING ORGANIC SUBSTANCES

Hisashi Hattori; Hidemitsu Takenoshita, and Yoichiro Hanada, all of Hirakata, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Aug. 20, 1986, Ser. No. 897,969
Int. Cl.[4] F23G 5/30
U.S. Cl. 110—245 3 Claims



1. A fluidized-bed incinerator comprising:

(a) a heating furnace accomodating a fluidized-bed consisting of refractory particles and having a combustion chamber formed in an upper portion thereof;

(b) a burner system for heating said fluidized-bed and for burning gaseous effluent produced by thermal decomposition within said bed, said burner system including a main burner diosposed in the upper portion of the wall of said furnace, above the level of the fluidized-bed of refractory particles and directed eccentric from the center axis of the furnace and at an angle from the horizontal between 0° and 30° downward, a pilot burner with its tip end opening toward said combustion chamber and disposed in the proximity of said main burner;

(c) a fuel feed circuit for feeding fuel from a fuel tank to said main burner and said pilot burner;

(d) an air feed circuit for feeding air from a tank to the bottom of said furnace and to said main burner, said air feed circuit including a solenoid-operated directional control valve for switching said fuel feed circuit and said air feed circuit to said main burner so as to provide, selectively, fuel and air to said main burner and being controlled by a means responsive a furnace temperature sensor;

(e) a porous dispersion plate located above the bottom of said heating furnace and defining the bottom of said fluidized-bed, said dispersion plate having a plurality of passages whereby air delivered to the bottom of said furnace is distributed evenly to the bottom of said fluidized-bed; and

(f) a furnace lid disposed in an openable and closable manner at a top opening portion of said furnace, said lid having an opening communicating said combustion chamber to the exterior of said furnace, said opening having therein a filter.

4,708,069

SOLID FUEL HEATING APPLIANCE

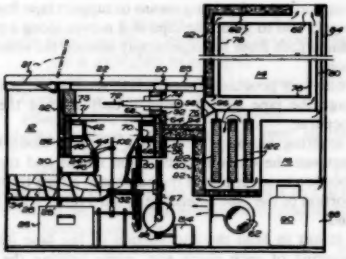
Archibald W. Kidd, Seend Close, Seend, Melksham, Wiltshire, England

Continuation of Ser. No. 496,209, May 19, 1983, abandoned. This application May 27, 1986, Ser. No. 867,629

Claims priority, application United Kingdom, May 21, 1982, 8214876; Jul. 19, 1982, 8220844; Jan. 28, 1983, 8302399

Int. Cl.⁴ F23K *3/14*

U.S. Cl. 110—275 **16 Claims**



1. A domestic or small industrial heating appliance fired by solid fuel, comprising;

a rotary furnace vessel to contain a fire of the fuel and having a bottom inlet for the fuel, said vessel including a wall part above said bottom inlet with holes for the admission of combustion air provided in said wall part;

vessel drive means to drive said vessel in rotation around a generally upright axis during at least part of the time when said vessel is in use;

fuel supply means for delivering the solid fuel to said bottom inlet of said furnace vessel;

a stationary enclosure surrounding said furnace vessel and spaced from said furnace vessel to define an air space between said furnace vessel and said enclosure, said enclosure comprising a stationary water jacket surrounding at least an upper region of said furnace vessel so as to absorb heat therefrom and cool at least an upper region of said furnace vessel, said water jacket being spaced from said furnace vessel so that said air space extends between said furnace vessel and said surrounding water jacket;

means to force combustion air to flow into said air space and thereafter into said furnace vessel through said holes therein; and

an air seal interposed between said water jacket and said upper region of said furnace vessel above said holes in said furnace vessel, said air seal extending outwardly from said furnace vessel, to said water jacket to define an upper boundary of said air space and constraining outflow of air from said air space to pass through said holes into the furnace vessel, said air seal comprising at least one moving flange fast with the furnace vessel and projecting therefrom and a co-operating stationary member fast with and projecting from said water jacket and lying face to face against said flange whereby both said stationary member and said moving flange are cooled by said water jacket absorbing heat therefrom, the moving flange and stationary member having apertures positioned so that the apertures in said moving flange and said stationary member periodically come into register during rotation of the furnace vessel, and then permit ash to fall through the apertures into said air space.

4,708,070

LOOPER ASSEMBLY FOR A TWO THREAD BAG CLOSING SEWING MACHINE AND TWO THREAD LOOPING PROCESS FOR CLOSING BAGS

Andrew J. Hiltner, Minneapolis, Minn., assignor to AXIA Incorporated, Oak Brook, Ill.

Continuation of Ser. No. 542,190, Oct. 19, 1983, abandoned. This application Dec. 23, 1985, Ser. No. 812,786

Int. Cl.⁴ D05B *13/00, 1/10, 73/12*

U.S. Cl. 112—10 **4 Claims**

1. A two thread type bag closing sewing machine capable of stitching a bag closed as the bag moves in a downstream direction through said machine comprising:

a rigid housing including a feed dog chamber;

driving means carried by said housing;

primary and secondary thread sources adjacent said housing for supplying primary and secondary thread, respectively;

a needle driving assembly movably mounted to said housing, operatively connected with said driving means and including a reciprocating needle movable along a needle path into and out of said feed dog chamber, said needle including an eye, said eye carrying a loop of said primary thread;

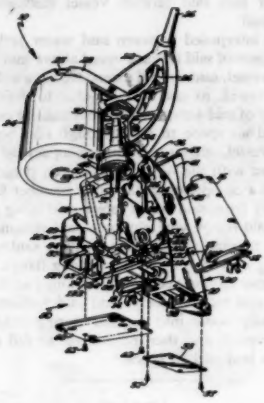
a presser foot assembly adjacent said needle and carried by said housing to bear against the bag;

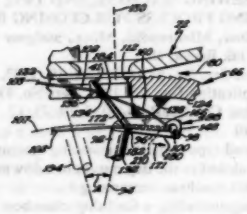
a feed dog assembly carried by said housing, operatively connected with said driving means and including a movable, reciprocating feed dog confronting the bag and cooperating with said presser foot assembly to advance the bag in said downstream direction past the reciprocating needle during stitching of the bag;

a throat plate adjacent said feed dog, said plate including a needle aperture communicating with said feed dog chamber and positioned along said needle path to receive said needle during stitching; and

a looper assembly consisting of a single looper drive shaft, a looper cam connected with said driving means and a single looper unit fixed to said single looper drive shaft, said looper drive shaft being movably mounted to said housing, having a central axis and being operatively connected with said looper cam for reciprocal swinging of said shaft through an arc about said looper shaft central axis, and said single looper unit consisting of a single combined loop hooking and thread inserting looper blade, said blade having a post with a post axis, said blade having an eye carrying a loop of said secondary thread, said

looper blade being swingable closely adjacent said needle path in response to swinging of said looper shaft in a first direction and away from said needle path in response to swinging of said looper shaft in a second direction with the locus of said post axis defining a single plane which is





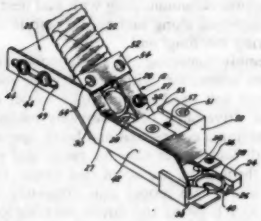
substantially stationary relative to said needle path during swinging of said looper shaft in both first and second directions, so said blade cooperates with said needle to hook said loop of said primary thread as said blade moves adjacent said needle and inserts said loop of secondary thread through said loop of primary thread.

4,708,071

RING POSITIONING APPARATUS FOR SEWING MACHINE

Theodore F. McKee, Muscatine, Iowa, assignor to McKee Machinery Co., Inc., Muscatine, Iowa

Filed Feb. 17, 1987, Ser. No. 15,362
Int. Cl.[4] D05B *3/22*
U.S. Cl. 112—113 **8 Claims**



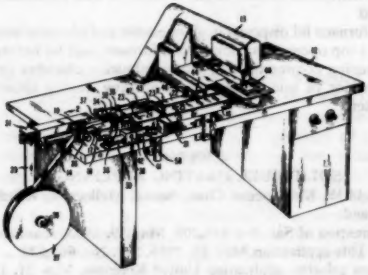
1. For use with a sewing machine for securing annular rings to a curtain, feed chute means comprising a chute body having a track formed therein for receiving annular rings sequentially and permitting discharge of same one at a time from an open end, a retaining tab adjacent the open end for at least partially blocking the track to prevent discharge of annular rings from the chute body, spring means for biasing the retaining tab to a track blocking position, and a slot defined in the chute body adjacent said open end, whereby, the retaining tab at least partially blocks the track to position an annular ring at least partially over the slot so that the sewing machine can secure the annular ring over the slot to the curtain and pulling the curtain will cause the retaining tab to yield while the sewn annular ring is advanced to a position over the slot.

4,708,072

TAPE FEEDING APPARATUS

Ricky J. Frye, Miamisburg, Ohio, assignor to MIM Industries, Inc., Miamisburg, Ohio

Continuation of Ser. No. 812,772, Dec. 24, 1985, abandoned. This application Jun. 17, 1986, Ser. No. 875,281
Int. Cl.[4] D05B *23/00, 37/04*
U.S. Cl. 112—121.27 **11 Claims**



7. Tape feeding apparatus to feed patches of tape from a tape supply toward a sewing location, the tape feeding apparatus comprising:

(a) supporting and guiding means to support tape from a tape supply and to guide the tape as it moves along a predetermined path from the tape supply toward the sewing location;

(b) one-way propulsion means intersecting the path to engage the tape and to move it only toward the sewing location;

(c) severing means at a severing location along the path between the one-way propulsion means and the sewing location to sever one of the patches at a time from the end portion of the tape extending toward the sewing location; and

(d) means to hold the end portion of the tape during the severing of each patch and, while holding the severed patch, to move the severed patch from the severing location toward the sewing location.

4,708,073

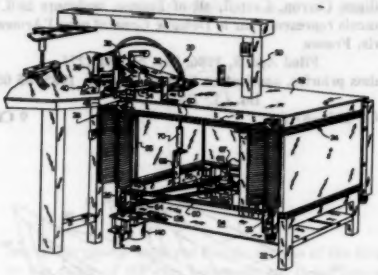
METHOD FOR PROCESSING FABRIC PIECES IN A CUT AND SEW OPERATION

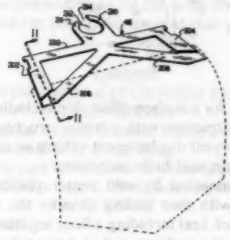
Robert L. Kellogg, Greensboro; Roger W. Zimmerman, Liberty, both of N.C., and Carney J. Bryan, St. Augustine, Fla., assignors to Blue Bell, Inc., Greensboro, N.C.

Filed Nov. 14, 1986, Ser. No. 931,703
Int. Cl.[4] D05B *21/00, 97/00*
U.S. Cl. 112—262.3 **3 Claims**

1. Method for processing fabric pieces during a cut and sew operation in the manufacture of apparel or similar textile goods comprising the steps of:

(a) separating and presenting cut fabric pieces successively to a clip insertion station in a prescribed sequence;
(b) releasably attaching a rigid handling clip to each of said fabric pieces;





(c) maintaining each of said clips with its corresponding fabric piece and transporting said fabric pieces by engagement of automated equipment with said clips rather than with said fabric pieces during further storage, transportation, and processing until said fabric piece is joined to its next generation apparel assembly or sub-assembly.

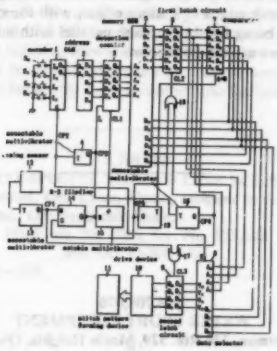
4,708,074

DEVICE FOR GENERATING STITCH FORMING DATA IN A SEWING MACHINE

Mitsuyoshi Takauchi, Yamagata, Japan, assignor to Happy Industrial Corporation, Yamagata, Japan

Filed Jul. 28, 1986, Ser. No. 890,913
Claims priority, application Japan, Oct. 19, 1985, 60-235522
Int. Cl.[4] D05B *3/02*
U.S. Cl. 112—453 **1 Claim**

1. A device for generating stitch forming data in a sewing machine to control the motion of a needle corresponding to the feed of a work fabric, comprising:
a plurality of switches for selecting a plurality of stitch patterns;
encoder means for producing encoded signals by the selection of the switches;
address means for producing a start address by the encoded signals from said encoder means;
detection counter means for adding pulse signals from an astable multivibrator to the start address from counting the address means to produce output signals;
memory means for memorizing pairs of stitch control signals and next stitch control signals in each address thereof, and for recovering the stitch control signals and next stitch control signals in response to the counting output signals from the detection counter means;
first latch means for latching the next stitch control signals from said memory means;
comparator means for comparing the next stitch control signals in said first latch means with the stitch control signals recovered by said memory means in response to the counting output signals of the detection counter means;
data selector means for applying the stitch control signals from said memory means, and for applying the next stitch control signals latched in said first latch means by applying a pulse to said detecting counter means;



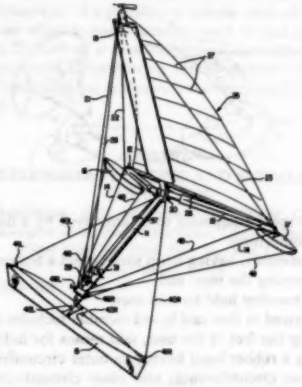
second latch means for latching the stitch control signals from said data selector means in turn;
drive means controlled by the stitch control signals from the second latch means; and
stitch forming means driven by said drive means.

4,708,075

MULTI-HULL SAILBOAT WITH FIXED AIRFOILS

Edwin des Snead, P.O. Box 1000, Georgetown, Tex. 78626

Filed Feb. 2, 1987, Ser. No. 9,710
Int. Cl.[4] B63B *35/00*
U.S. Cl. 114—39.1 **20 Claims**



1. A sailboat comprising
a tripod frame supported on the water by three independent buoyant hulls; said tripod frame comprising three spars extending outwardly and downwardly from a center juncture point, and providing hull support points at the respective distal ends of said spars; said frame spars including a windward spar providing a windward support point and two leeward spars providing two leeward support points;

a mast spar mounted on said frame at said center juncture point with its masthead disposed equidistant from said leeward support points and toward said windward support point;

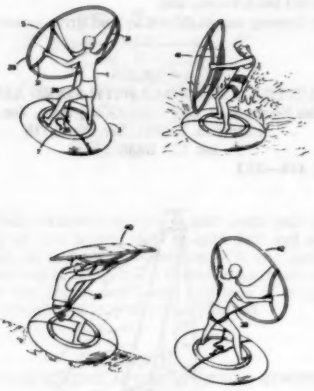
said three independent buoyant hulls being coupled to said three frame support points, for rotation about respective vertical axes; said mast spar being configured, at least in part, as an airfoil symmetrical about its longitudinal axis with both edges as leading edges; with the chord of said airfoil being fixed in a plane parallel with a line between said leeward support points.

4,708,076

WATER SPORT EQUIPMENT

David Lekhtman, 324 Rte. 329, Morin Heights, Quebec, Canada (J0R 1H0)

Filed Apr. 15, 1986, Ser. No. 852,318
Int. Cl.[4] B63H *9/04*
U.S. Cl. 114—39.2 13 Claims



1. Water sport equipment to be employed by a user having feet, and comprising:

a board member, having a top surface and a bottom surface, for carrying the user; and

a glider member held by said user;

characterized in that said board member includes means for holding the feet of the user, said means for holding comprising a rubber band having an outer circumference and an inner circumference; said outer circumference being fixedly attached to the top surface of said board member; said inner circumference being unattached to said top surface of said board member; said rubber band being centrally disposed on the top surface of said board member;

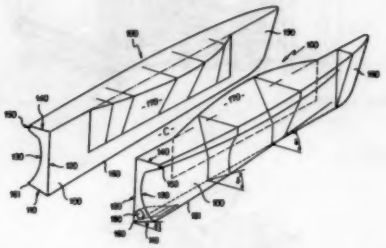
whereby, a user can insert his feet under the band through the unattached inner circumference so that his feet are held by the rubber band in such a manner that the user can change position on the top surface of the board member without the rubber band releasing the hold on his feet.

4,708,077

HULL SHAPES FOR SURFACE EFFECT SHIP WITH SIDE WALLS AND TWO MODES OF OPERATION

Robert Balquet, Paris; Robert Baubeau, Vitry sur Seine; Jean-Paul Bertrand, Paris; Jean-Pierre Guezou, Athis Mons, and Philippe Carron, Creteil, all of France, assignors to L'Etat Francais represente par le Delegue General pour l'Armement, Paris, France

Filed Apr. 8, 1986, Ser. No. 849,275
Claims priority, application France, Apr. 29, 1985, 85 05312
Int. Cl.[4] B63B *1/38*
U.S. Cl. 114—67 A 9 Claims



1. A ship hull for a surface effect ship including a catamaran type supported structure with a center structure able to operate either a a buoyant displacement vehicle or as an air cushion supported vehicle, said hull comprising:

two keels connected by said center platform, said keels confining with two sealing devices the supporting air cushion, each keel including a floor segment, an inner side wall facing the cushion, and an outer side wall, wherein:

the floor segment is angled upwardly in a direction away from said air cushion with respect to a horizontal plane defining an angle therebetween, said angle increasing continuously from an aft end to a fore end of said each keel, said each keel forming a deep V-shape at the fore end;

said inner side-wall is substantially vertical and planar proximate the fore and aft ends of said each keel and includes an arcuate inwardly directed bulged portion at an upper central portion of said inner side wall;

the outer side wall has a transverse cross-sectional shape which changes continuously along the length of said each keel from a curve concave outwardly from said air cushion at the aft end to a substantially linear shape proximate the fore end.

4,708,078

PROPULSIVE WING WITH INFLATABLE ARMATURE

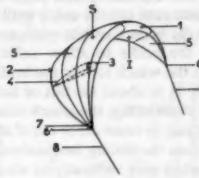
Dominique M. Legaignoux, and Bruno T. Legaignoux, both of 26, ch. deKernoter, 29000 Quimper, France

PCT No. PCT/FR85/00318, § 371 Date Aug. 13, 1986, § 102(e) Date Aug. 13, 1986, PCT Pub. No. WO86/02902, PCT Pub. Date May 22, 1986
PCT Filed Nov. 8, 1985, Ser. No. 905,335
Claims priority, application France, Nov. 16, 1984, 84 17701
Int. Cl.[4] B64C *3/46;* B63H *9/06*
U.S. Cl. 114—102 4 Claims

1. In a propulsive wing of an aerodynamic profile linked by control ropes to a load, the wing including a thin flexible envelope and having a top surface and a bottom surface and an inflatable armature made up of a first strut and second struts, the first strut extending along a leading edge of the wing and having a thickness dimension that varies according to location along the wing leading edge whereby the first sturt has a thickness at its extremities that is less than the thickness of the first sturt near the middle section thereof, the wing having a

tailing edge, the first strut extremities forming tips, the improvement in combination therewith comprising:

the leading and trailing edges of the wing being oriented to intersect each other near the first strut tips and the wing having an arcuate shape between the tips to form a lune-like spehrical segment which curves in two planes from



one of the tips through the middle section of the first sturt to the other of the tips with each tip being adapted to receive a control rope with only two control ropes being required by the wing, the improvement further comprising the variation of the first strut thickness dimension defining a crescent shape for the wing dimension between the top and the bottom surfaces of that wing.

4,708,079

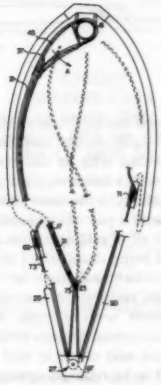
FLEX WING APPARATUS WITH RESILIENT COUPLINGS

Jeffrey J. Magnan, Orange County, Calif., assignor to Gaastra Sails International Ltd., Hong Kong

Continuation-in-part of Ser. No. 594,476, Mar. 28, 1984. This application Sep. 5, 1984, Ser. No. 647,549

Int. Cl.[4] B63H *9/06*

U.S. Cl. 114—103 **7 Claims**



1. A flex wing apparatus comprising

a support;

a mast coupled to the support and projecting therefrom;

a sail of flexible material, said sail having a leading edge, a trailing edge and a luff sleeve at the leading edge for receiving the mast;

a plurality of resilient battens, each of said battens having leading and trailing ends;

batten pockets on the sail for carrying the battens, respectively, with the battens extending toward the leading edge of the sail, at least one of said batten pockets having a forward end which is closed sufficiently to retain the leading end of the batten therein against forward movement;

coupling means for coupling the battens to the mast for pivotal movement of the battens and sail about the mast;

said coupling means including a plurality of couplings within said luff sleeve, each of said couplings having a collar at least partially surrounding the mast and rotatable about the mast and at least one resilient legs coupled to said collar;

said coupling means including coupling pockets on the sail for respectively receiving said legs and coupling said legs to the sail with the legs being adjacent associated battens and for resisting forward movement of the battens; and

means for resiliently deforming the battens varying magnitudes to induce the desired camber into the battens and the sail.

4,708,080

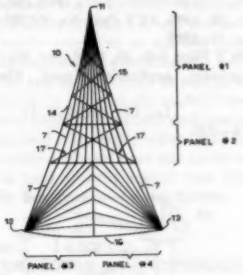
COMPOSITE THREAD LINE SAILS

Peter G. Conrad, Old Lyme, Conn., assignor to Sobstad Sailmakers, Inc., Old Saybrook, Conn.

Filed Jun. 11, 1986, Ser. No. 873,188

Int. Cl.[4] B63H *9/06*

U.S. Cl. 114—103 **17 Claims**



1. A composite sail having a head, a tack and a clew, which in use and for an intended purpose has principal stress lines, said sail comprised of a plurality of panels, each of said panels joined to an adjacent panel therefor, each of said panels comprised of a laminate of at least two layers whereinbetween said layers nonwoven, force-bearing thread material is predeterminedly disposed along said principal stress lines for said panel in said sail.

4,708,081

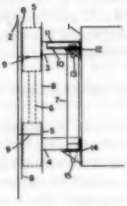
STABILIZER FOR FLOATING AND SUBMERSIBLE STRUCTURES

Arsham Amirikian, 6526 Western Ave., Chevy Chase, Md. 20815, assignor to Arsham Amirikian, Chevy Chase, Md.

Filed May 30, 1986, Ser. No. 868,720

Int. Cl.[4] B63B *21/00*

U.S. Cl. 114—230 **4 Claims**



1. A stabilizer system for mooring a floating or submersible

structure to a fixed support structure and for laterally immobilizing said moored floating or submersible structure, said system comprising a plurality of rigid frame units composed of tubular members with readily detachable connections, said frame units comprising a first side having an upper and a lower attachment to said floating or submersible structure, and a second side having an upper cylindrical joint piece and a lower cylindrical joint piece, and a leg member rigidly connecting said upper cylindrical joint to said lower cylindrical joint, said upper cylindrical joint piece having a first arm extending horizontally towards said upper attachment, said lower cylindrical joint piece having a second arm extending horizontally towards said lower attachment, said fixed support structure having a slitted cylindrical vertical track for engaging said cylindrical joint pieces and for providing guidance to vertical movements and restraint against rotational and lateral movements of said floating or submersible structure.

4,708,082

MOORING APPARATUS

Harutaka Ohta; Kazuchiyo Miyamoto, both of Kanagawa; Arataro Terayama, Tokyo; Seiji Maruhashi, and Shigeru Gohdo, both of Kanagawa, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

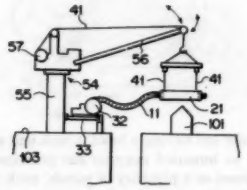
PCT No. PCT/JP85/00089, § 371 Date Jun. 28, 1985, § 102(e) Date Jun. 28, 1985, PCT Pub. No. WO85/05608, PCT Pub. Date Dec. 19, 1985

PCT Filed Feb. 26, 1985, Ser. No. 756,497

Claims priority, application Japan, May 31, 1984, 59-79424[U]

Int. Cl.[4] B63B *21/16*

U.S. Cl. 114—230 **1 Claim**



1. A mooring arrangement comprising at least two mooring apparatus disposed a selected distance apart from each other on a deck (**103**) of a moving vessel (A) for mooring the moving vessel (A) to another vessel (B) or a quay having a bitt (**101**) or bollard at locations opposite to the mooring apparatus, each said mooring apparatus comprising

a vertically extending post (**51**) rotatably anchored to said deck (**103**) and rotatable in a horizontal plane;

an arm (**52**) attached to a top of said post and disposed to be horizontally rotatable with said post and independently rotatable in a vertical plane, said arm having a pulley at an end opposite to the attached end for holding a cable (**40**);

a coiling mechanism (**53**) attached to said top of said post and holding one end of said cable (**40**) for coiling said cable (**40**);

a bitt part (**20**) connected to the other end of said cable (**40**) and located below said pulley opposite said coiling mechanism (**53**), and comprising a geometric structure shaped to fit between or about said bitt or bollard (**101**) on said other vessel or quay;

a bridle (**10**) having one end thereof connected to said bitt part (**20**); and

a winch (**30**) connected to another end of said bridle for tightening and loosening said bitt part after attachment to said bitt or bollard, said winch being disposed below said arm (**52**) and connected to said post to be simultaneously rotatable in the horizontal plane with said post and always in the same direction as said arm (**2**);

whereby to effect mooring, the moving vessel (A) is brought adjacent the other vessel (B) or quay with the at least two mooring apparatus positioned opposite the bitts or bollards on the other vessel or quay, then the post and winch are concurrently rotated in the horizontal plane and the arm is vertically rotated so that the end of the arm having the pulley extends slightly further into the other vessel or quay than the corresponding bitt or bollard, then the coiling mechanism runs out the cable until the bitt part is about or within the bollard or bitt while concurrently the winch releases the bridle to allow sufficient length of bridge, and then the winch rolls in the bridle until the bitt part fits securely in or about the bitt or bollard; and

whereby to effect dismooring, the winch releases the bridle to allow the bitt part to come off or out of contact with the bitt or bollard, then the coiling mechanism coils the cable and runs up the bitt part vertically to about the point of the pulley located at an end of the arm, and then the post and winch are horizontally rotated so that the arm is within the confines of the vessel

wherein said bitt part comprises an end of said bridle connected to form an eye splice, and a ring disposed within said eye splice, and further said bitt part is held by said cable in at least three points along the periphery of the ring.

4,708,083

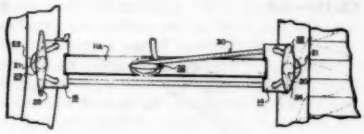
MOORING DEVICE FOR BOATS

Chris L. Billings, 527 Miller Ave., Layton, County of Davis, Utah 84041

Filed Dec. 22, 1986, Ser. No. 944,178

Int. Cl.[4] B63B *21/00*

U.S. Cl. 114—230 **3 Claims**



1. A hand-manipulated device for mooring boats, including, in combination: an elongate spacer member having opposite end fittings each provided with an outer edge, each of said edges being provided with a concave, cleat-post receiving seat, said fittings lying essentially in the same plane, and said fittings each being provided with a pair of cord-receiving apertures; a cord disposed through all of said apertures and knotted at one end thereof, said cord being constructed to form, selectively, loops respectively proximate said edges for routing over external dock and boat cleats, respectively, and said elongate spacer member being provided with a cleat for receiving the wrapped, tightened securement thereto of said cord when said cord is tightened about said cleats at said loops, said cleats thereby being adapted to be retained against said seats of said opposite end fittings by said cord when so tightened.

4,708,084

SYSTEM FOR DISTRIBUTING WATER FLOW BETWEEN A RESERVOIR AND A WATER SOURCE

Daniel N. Campau, 656 Duxbury Ct., Grand Rapids, Mich. 49506

Continuation-in-part of Ser. No. 629,310, Jul. 10, 1984, Pat. No. 4,589,441. This application Feb. 20, 1986, Ser. No. 831,929

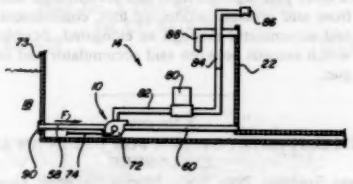
Int. Cl.[4] B63B *35/26*

U.S. Cl. 114—255 **25 Claims**

1. A water distribution system to provide directed water flow between a water source and a live well in a boat being used in moving and stationary states in the water source, comprising:

a water inlet/outlet port in communication with said water source;

valve means for directing water flow between said live well and said inlet/outlet port and having first and second operating conditions in said water distribution system, said valve means including first check valve means operative when said valve means is in said first operating condition for permitting water flow through said valve means only to empty said live well or to keep empty said live well and



second check valve means operative when said valve means is in said second operating condition to permit water flow through said valve means only to fill said live well, to maintain the water level in said live well or to recirculate the water through said live well throughout said moving and stationary states of said boat; and

pump means having a pump pipe coupled to said valve means for providing a pressure differential across said valve means to fill, maintain and recirculate the water in said live well.

4,708,085

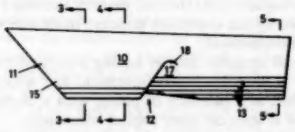
MARINE HULL

Leonard J. Blee, 66 Leslie Avenue, Blair Athol, Australia (5084)

Filed May 19, 1986, Ser. No. 864,822

Int. Cl.[4] B63B *1/32*

U.S. Cl. 114—290 **12 Claims**



1. A marine hull wherein the shape of the bottom includes surfaces which define a plurality of channels each of which extends both rearwardly and laterally outwardly, and is inclined, in plan, with respect to the central lognitudinal vertical plane of the hull, the cros-sectional shape of each said channel being defined by a surface which first interrupts and deflects the water into a downwardly concave channel portion which is itself of such shape that it further intercepts and deflects that water when the hull is mobile, and the water so intercepted and deflected moves firstly upwardly and rearwardly with respect to the hull thereby imparting a vertical component of kinetic energy to that water which then moves downwardly and rearwardly whereby change of direction transforms that kinetic energy into lift, sufficient length of said bottom having said channels extending across it that said lift occurs over a major portion of the length of the hull.

4,708,086

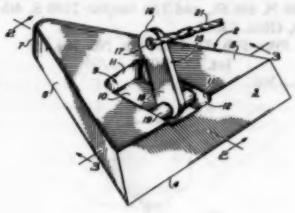
BOAT ANCHOR

Thomas E. Brown, Jr., 1153 Gooseberry Hill, Shreveport, La. 71118

Filed Jan. 23, 1986, Ser. No. 821,855

Int. Cl.[4] B63B *21/24*

U.S. Cl. 114—294 **5 Claims**



1. A boat anchor for stabilizing a boat on a water body by means of an anchor rope extending between the boat anchor and the boat, said boat anchor comprising a generally triangular-shaped base member; a tapered blade shaped in one leg of said base member; a cavity provided in said base member, with the floor of said cavity extending at one end thereof to said blade and a lever having one end extending into said cavity and pivotally carried by said base member in said cavity and the opposite end of said lever carrying the anchor rope, whereby said lever is pivotally disposed with both ends inserted entirely in said cavity in recessed relationship when said boat anchor is not in use and pivotally deployed from said cavity toward said blade responsive to tension in the anchor rope when said anchor is functionally depolyed on a water bottom.

4,708,087

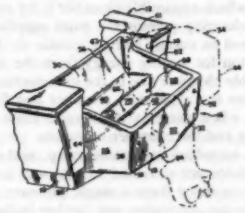
OUTBOARD MOTOR MOUNTING DEVICE

William S. Potter, Jr., 4235 Douglas Rd., Coconut Grove, Fla. 33133

Filed Aug. 12, 1985, Ser. No. 764,543

Int. Cl.[4] B63H *5/12*

U.S. Cl. 114—352 **2 Claims**



1. An outboard motor mounting device comprising a body having a sealed hollow interior to provide buoyancy to said mounting device, a bottom wall, opposed side walls, a front wall, a first flange which is connected to said front wall and which extends upwardly from said device, mounting means for mounting said body to a transom of a boat, a rear wall with an upwardly extending second flange for receiving and mounting an outboard motor and an upwardly facing concave formation into which a portion of the outboard motor can be moved when raising the propeller of the motor out of the water, wherein said concave formation is stepped in a fore and aft direction to provide an upwardly facing cavity with a forward stepped portion and a rearward deeper portion, and further wherein said forward stepped portion extends forwardly from said front wall of said body and then upwardly, the upwardly

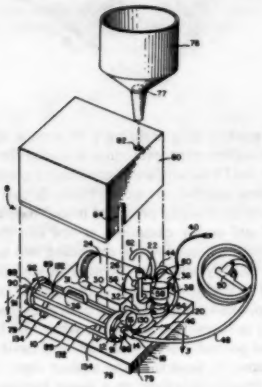
extending portion defining and forming said first flange, the lower surface of said forward stepped portion being adapted to be received in and supported by a recessed step formation in a transom of a boat.

4,708,088

SPRAYING METHOD AND APPARATUS

Gene Purvis, 7704 Grensted, Lawton, Okla. 73505; Russell Phelps, 106 N. 6th St., and Tim Dupler, 2100 S. 4th St., both of Lawton, Okla. 73501

Filed Feb. 22, 1985, Ser. No. 704,527
Int. Cl.[4] B05B *15/06*
U.S. Cl. 118—300 **4 Claims**



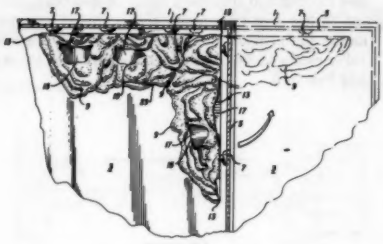
1. A portable, airless paint spraying apparatus comprising:
(a) a paint pump for pumping liquid paint,
(b) a motor coupled with said pump for driving said pump,
(c) said pump having an inlet for receiving unpressurized paint and an outlet for discharging pressurized paint,
(d) an accumulator which communicates with said pump outlet for accumulating pressurized paint and discharging the paint under pressure, said accumulator including a pressure vessel, a piston slideable in said pressure vessel, an expansible chamber partially defined by one side of said piston, which expansible chamber is for receiving, storing and discharging pressurized paint supplied by said paint pump, and an energy storing section on the other side of said piston for storing energy from the expansion of the expansible chamber due to the introduction of pressurized paint into the expansible chamber and for releasing the energy when paint is discharged from the expansible chamber and the chamber contracts,
(e) a base on which said paint pump, said motor, and said accumulator are mounted so that said base, paint pump and accumulator form a single pressure producing unit, said pressure producing unit further including:
(i) a pressure gauge connected with a fluid coupling which in turn communicates with said accumulator;
(ii) an adjustable pressure switch which determines upper and lower pressure limits for pressurized paint stored in said accumulator, said pressure switch being in communication with said accumulator;
(iii) an actuating switch with a switch handle coupled with said motor for energizing or de-energizing said motor; and
(iv) a paint fill tube coupled with said paint pump for feeding paint to be pressurized into said pump, said pressure-producing unit further including a case for coupling with said base in registry therewith, which case surrounds said accumulator, said pump and said motor of said pressure producing unit; said case including an upright slot for accommodating said coupling so as to allow communication between said accumulator which is disposed within said case and said spray gun which is disposed outside said case, said case also including an opening in registry with said fill tube to allow paint which is to be pressurized to be introduced from outside said case and fed to said paint pump inside said case, said pressure gauge, said pressure switch and said actuating switch all being disposed outside said case when said case is in registry with said base so as to all be accessible from outside said case, and
(f) a spray gun, separate from said accumulator and separate from said pressure producing unit, communicating with said accumulator through an elongated, flexible conduit which extends between said accumulator and said spray gun.

4,708,089

ANIMAL HABITAT SYSTEM FOR USE IN AN ANIMAL ENCLOSURE

Jerome Goldman, New York; Marvin Goldman, Great Neck; Gerald Phillips, Glen Cove; Terry Goldman, New York, and Joseph Pesin, Brooklyn, all of N.Y., assignors to Penn Plax Plastics, Inc., Garden City, N.Y.

Filed Jun. 12, 1986, Ser. No. 873,650
Int. Cl.[4] A01K *64/00*
U.S. Cl. 119—5 **15 Claims**



1. A small animal habitat system for use in an animal enclosure comprising:
(a) at least one habitat component in the form of a wall structure having an outer side wall and an inner side wall, the inner side wall being essentially concave, a major portion of the inner side wall being substantially depressed from a highest point thereof, thereby forming a gap space enclosed by the essentially concave inner side wall of the habitat component;
(b) the wall structure further having a circumferential edge which is irregular in configuration, and which is intermeshable, at a plurality of points with a circumferential edge of at least on other habitat component;
(c) one or more openings through the habitat component wall forming a passageway therethrough;
(d) a means to removeably and securely attach the habitat component to a inner wall surface of an animal enclosure, the means formed on the inner side wall of the habitat component.

4,708,090

METHOD FOR FEEDING FISH

Ole Molaug, Bryne; Sveinung B. Havrevold, Kvernaland, and Odd Skjaeveland, Sandnes, all of Norway, assignors to Akva A/S, Bryne, Norway

Filed May 14, 1985, Ser. No. 733,880
Int. Cl.[4] A01K *61/02*
U.S. Cl. 119—51 R **7 Claims**

1. A method of feeding fish in a piscicultural environment, comprising the steps of:

producing a stream of water oversaturated with a gas; and conducting feed in said oversaturated stream of water to a feeding situs;

such that said oversaturated stream of water releases gas which adheres to the feed, thereby increasing the buoyancy of the feed.

4,708,091

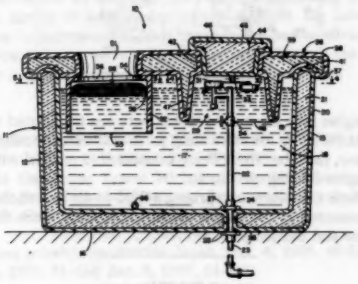
ANIMAL WATERING APPARATUS

Kenneth L. Schafer, Rte. 3, Box 73, Le Sueur, Minn. 56058

Filed Jun. 3, 1985, Ser. No. 740,722

Int. Cl.[4] A01K *7/00*

U.S. Cl. 119—73 **23 Claims**



14. An animal watering apparatus comprising: housing means having generally upright walls and a bottom wall surrounding an internal chamber for accommodating water, and a top wall joined to the upright walls closing the top of the chamber, said top wall having at least one drinking well opening to provide animal access to the water in the chamber, (a) baffle means secured to said top wall, said baffle means comprising a baffle wall having an inside surface surrounding a drinking well, said drinking well being aligned with said at least one drinking well opening, said wall of the baffle means extended downwardly into said chamber below the normal level of the water in the chamber, and float closure means located in the drinking well surrounded by said baffle wall below said at least one drinking well opening, said float closure means providing a barrier to separate the outside air in the at least one drinking well opening from the water in the chamber, said float closure means comprising a flexible porous float having an outer peripheral edge located in contiguous relationship relative to the inside surface of the baffle wall allowing water to flow through said float whereby when an animal moves the float down into the drinking well the outer peripheral edge of the flexible porous float moves relative to said inside surface of the baffle wall and water flows through the float making water available for drinking by the animal.

4,708,092

CIRCULATING FLUIDIZED BED BOILER

Folke Engström, San Diego, Calif., assignor to A. Ahlstrom Corporation, Karhula, Finland

PCT No. PCT/FI86/00007, § 371 Date Sep. 22, 1986, § 102(e) Date Sep. 22, 1986, PCT Pub. No. WO86/04402, PCT Pub. Date Jul. 31, 1986

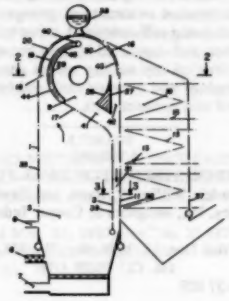
Continuation-in-part of Ser. No. 734,716, May 16, 1985, Pat. No. 4,672,918. This PCT application Jan. 23, 1986, Ser. No. 915,065

Claims priority, application Finland, Jan. 29, 1985, 850372

Int. Cl.[4] F22B *1/00*

U.S. Cl. 122—4 D **7 Claims**

1. In a circulating fluidized bed boiler having a vertical combustion chamber and a convection part which at least partly are formed by tube walls, and a horizontal cyclone separator, the gas inlet channel of which is connected to the upper part of the combustion chamber and a return channel for



solids to the lower part of the combustion chamber, the improvement comprising two opposite tube walls of the combustion chamber being used to form the cyclone separator.

4,708,093

APPARATUS FOR DRYING AND SUPERHEATING STEAM

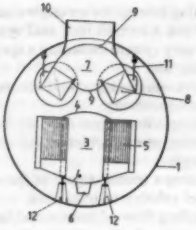
Günter Keintzel, Engelskirchen, and Klaus Westebbe, Gummersbach, both of Fed. Rep. of Germany, assignors to L. & C. Steinmüller GmbH, Gummersbach, Fed. Rep. of Germany

Filed Jun. 19, 1986, Ser. No. 876,981

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1985, 3522428

Int. Cl.[4] F22G *1/00*

U.S. Cl. 122—483 **10 Claims**



1. In an apparatus for drying and superheating steam, especially for supplying steam to a turbine, with said apparatus including a horizontal cylindrical pressure tank having a wall and having at least one steam inlet as well as having a centerline, a water separator mechanism that is disposed in the lower portion of the pressure tank and extends essentially over the entire length of said tank, a superheater mechanism that is disposed in the upper portion of said pressure tank and extends essentially over the entire length of said tank, and at least one steam outlet disposed on the upper side of said tank and connected to said superheater mechanism so that said water separator mechanism and said superheater mechanism are embodied as structural groups and the steam discharges dried out of said water separator mechanism directly into said pressure tank and from there enters into said superheater mechanism, the improvement therewith which comprises:

said pressure tank including two end faces, with said at least one steam inlet being disposed at one of said end faces; said water separator mechanism having a predetermined shape in a direction toward the center line of the tank and having two ends, one of which is wider and receives wet steam from said steam inlet at an angle to the centerline of

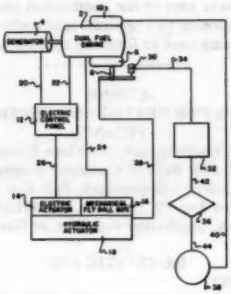
said tank, with said water separator mechanism being disposed in said pressure tank in such a way that dry steam leaving said water separator mechanism enters said pressure tank; said water separator mechanism and said superheater mechanism as structural groups closed in themselves each being self-contained, mounted independent of one another, and supported by said pressure tank as well as being free of any sealing means extending over the entire length of said pressure tank and being held against the wall of said pressure tank.

4,708,094

FUEL CONTROL SYSTEM FOR DUAL FUEL ENGINES

Melvin J. Helmich; William P. Ryan, and David H. Marvin, all of Grove City, Pa., assignors to Cooper Industries, Houston, Tex.

Filed Dec. 15, 1986, Ser. No. 941,658
Int. Cl.[4] F02B 3/00
U.S. Cl. 123—27 GE 10 Claims



1. A fuel governing system for an engine adapted for operation on a first fuel and a second fuel, said system comprising:

a first fuel governing system including a spontaneous motion metering means; and

a second fuel governing system, said second fuel governing system further comprising:

means for providing a first signal indicative of position of the first fuel metering means, which signal approximates total load on the engine,

means for providing a second signal of the selected percentage of first fuel relative to total load,

means for controlling flow of said second fuel to said engine, which flow causes reflective displacement of said first fuel metering means,

means for determining the difference between said first signal and said second signal, which difference is indicative of distance the first fuel metering means must be moved to attain the selected percentage of first fuel relative to total load, and

means for causing operation of said means for controlling flow of said second fuel to said engine to cause displacement of said first fuel metering means equal to the distance the first fuel metering means must be moved to attain the selected percentage of first fuel relative to total load.

4,708,095

COMBINED ENGINE COOLING AND LUBE SYSTEM

Garry M. Luterek, Waterloo, Iowa, assignor to Deere & Company, Moline, Ill.

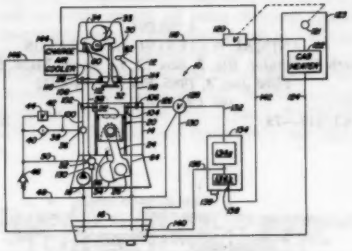
Filed Jun. 16, 1986, Ser. No. 874,903
Int. Cl.[4] F01P 3/00
U.S. Cl. 123—41.42 5 Claims

1. In a vehicle having an internal combustion engine, an engine cooling and lube system comprising: an engine oil sump;

an engine oil pump;

a flow divider having an inlet communicated with an outlet of the pump, a first outlet and a second outlet;

an engine cooling circuit connected between the first outlet and the sump for cooling heated parts of the engine;



an engine lube circuit connected between the second outlet and the sump for lubricating parts of the engine subject to wear, the lube circuit being connected in parallel with the engine cooling circuit; and

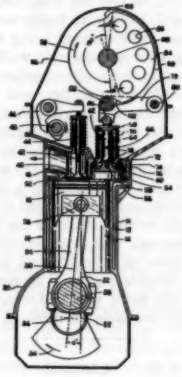
a vehicle cab heater comprising a fluid-to-air heat exchanger connected in the engine cooling circuit between the engine and the sump.

4,708,096

INTERNAL COMBUSTION ENGINE

Joseph Mroz, 2572 Montgomery Street, Montreal, Quebec, Canada (H2K 2S4)

Filed Feb. 24, 1986, Ser. No. 832,446
Int. Cl.[4] F02B 75/04
U.S. Cl. 123—48 A 7 Claims



1. An internal combustion engine comprising: an engine block defining a cylinder, a cylinder head closing one end of said cylinder, a power piston in said cylinder, a crank shaft journalled in said engine block at the other end of said cylinder, a connecting rod pivotally connecting said power piston and said crank shaft, said power piston reciprocable in said cylinder between upper and lower dead center positions, the cylinder space between said power piston and said cylinder head defining a working chamber for receiving a combustible mixture to be ignited by ignition means, intake and exhaust valves in said cylinder head, the axis of said crank shaft being laterally offset from the longitudinal axis of said cylinder, so that the connecting rod longitudinal axis makes an angle with

the cylinder longitudinal axis when said connecting axis intersects the crank shaft axis, said angle in a direction to increase a resulting torque arm between the power piston and the crank shaft axes during each power stroke of said power piston, and said connecting rod longitudinal axis substantially coinciding with the longitudinal axis of said cylinder when ignition of said combustible mixture occurs, a secondary cylinder made in said cylinder head having a diameter at the most equal to 0.4 that of said cylinder and fully communicating with said working chamber, a secondary piston reciprocable within said secondary cylinder between a fixed retracted position and a fixed advanced position closer to said working chamber, and reciprocating means effective to move said secondary piston from said retracted to said advanced position at a start of each power stroke of said power piston and prior to ignition, and from advanced to retracted position at a beginning of each intake stroke of said power piston wherein the advanced position is maintained at least through the power stroke, and the retracted position is maintained at least through the intake stroke.

4,708,097

INDUCTION SYSTEM FOR V-TYPE INTERNAL COMBUSTION ENGINE

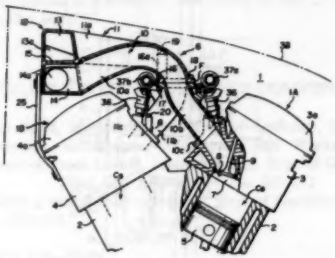
Kouichi Hatamura; Tetsuo Hiraoka; Kazuaki Hokazono, and Shinji Seike, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Oct. 2, 1986, Ser. No. 914,662

Claims priority, application Japan, Oct. 4, 1985, 60-221650; Jan. 6, 1986, 61-434; Jan. 6, 1986, 61-435

Int. Cl.[4] F02B *75/18*

U.S. Cl. 123—52 M **19 Claims**



1. An induction system for a V-type internal combustion engine having a first bank and a second bank respectively constituted with a plurality of cylinders and shifted with respect to each other in the direction of alignment of said cylinders, including intake ports provided to face the space between said first and second banks, each being communicated with one of said cylinders, fuel injection means for injecting fuel into said cylinders, each provided in the vicinity of one of said intake ports, fuel distributing means for distributing fuel to said fuel injection means arranged in the direction of alignment of said cylinders in a space between said first and second bank, each connected with one of said fuel injection means, a first and second surge tank means having a predetermined inner volume, each feeding intake air to one of said banks, said first surge tank means overlying said second surge tank means, said first and second surge tank means being arranged in the direction of alignment of said cylinders above said first bank, first independent intake passage means each connected with the side portion of said first surge tank means at one end thereof and with one of said intake ports of the cylinders constituting the first bank to lead intake air thereto at the other end, and second independent intake passage means each connected with the side portion of said second surge tank means at one end thereof and with one of said intake ports of the cylinders constituting said second bank at the other end thereof, said first and second independent intake passage means consisting of downstream intake passage means and upstream intake passage means, each said downstream intake passage means connected with one of said intake ports and extending toward a space between said fuel distributing means, each said upstream intake passage means being curved above the fuel distributing means for distributing fuel to the fuel injector means provided for the cylinders of the first bank and connected with said downstream intake passage means at one end thereof and with said first or second surge tank means at the other end thereof.

4,708,098

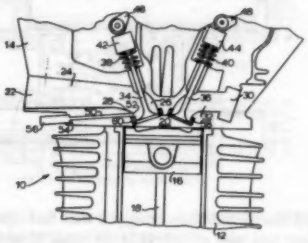
APPARATUS AND METHOD FOR INCREASING POWER OUTPUT OF AN INTERNAL COMBUSTION ENGINE

Laurence W. McCracken, Rte. 1, Box 298, Chapel Hill, N.C. 27514

Filed Mar. 13, 1987, Ser. No. 25,617

Int. Cl.[4] F02B *75/18*

U.S. Cl. 123—52 M **14 Claims**



1. In an internal combustion engine including:

a combustion chamber;

an intake port through which an air/fuel mixture is introduceable into the combustion chamber;

an intake passage communicating with the intake port for flowing the air/fuel mixture to the combustion chamber; and

an intake valve reciprocally moveable between (a) a first open position for introduction of the air/fuel mixture into the combustion chamber via the intake port, and (b) a second closed position accommodating combustion of the air/fuel mixture in the combustion chamber;

wherein the intake passage has a curved portion in the vicinity of the combustion chamber, comprising a convexly curved interior surface;

the improvement comprising;

a fluid withdrawal passage entering the curved portion of the intake passage at its convexly curved interior surface, and having an outer end external to the intake passage; and

means for applying suction to the outer end of the fluid withdrawal passage, during flow of the air/fuel mixture through the intake passage from the intake port to the combustion chamber while the intake valve is in said first position, to withdraw a minor portion of the air/fuel mixture and increase the rate of said flow of air/fuel mixture to the combustion chamber.

4,708,099

CRANKLESS RECIPROCATING INTERNAL COMBUSTION ENGINE

Frank A. Ekker, 168 S. E. R. R. Ave., Ponchatoula, La. 70454

Filed Dec. 12, 1985, Ser. No. 808,102

Int. Cl.[4] F02B *75/16, 75/08*

U.S. Cl. 123—54 A **2 Claims**

1. A crankless internal combustion engine comprising:

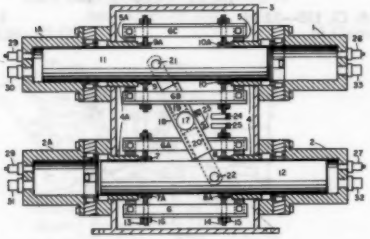
a. at least one ringless metal double headed piston having heads of which are lined with a heat insulating material,

b. a pair of coaxial hollow cylinders per ringless piston

which are held in alignment by a housing means so that the piston moves within the cylinder without physically contacting walls of the cylinder thus eliminating lubrication,

c. piston support and guide bearings which are suitably attached near a bottom of each said cylinder of said pair external to the cylinder bore and serve as sole means to hold the piston in alignment with the cylinder bore so no physical contact occurs between the piston and the cylinder during operation,

d. said housing means supporting and holding said coaxial cylinders and said piston support and guide bearings within suitable alignment to prevent unintended contact between the piston and the cylinder walls during operation,



e. said coaxial cylinders equipped with fuel injectors, sparkplugs and inlet air valves in the walls of said cylinders,

f. a power output shaft with its axial center line at right angles to the axial center line of the coaxial cylinder pair and suitably supported by the housing with means provided to reliably interconnect the double headed piston and the power output shaft,

g. an electronic control circuit which monitors engine speed and load and commands the fuel injectors to make at least one fuel injection during a compression and expansion stroke and activates sparkplug firing when engine speed is too slow to maintain a compression ratio above 18:1,

h. a high efficiency turbocharger attached such that maximum turbocharging of the engine results at all engine power levels and speeds.

4,708,100

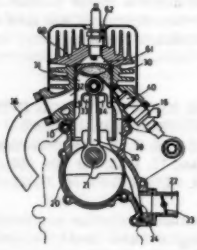
TWO-STROKE ENGINE WITH INJECTED FUEL GASIFYING CHAMBER IN PISTON

Jih-Tzang Luo, Hsin Chu Hsien, Taiwan, assignor to Industrial Technology Research Institute, Hsin Chu Hsien, Taiwan

Filed Dec. 29, 1986, Ser. No. 947,086

Int. Cl.[4] F02B *33/04*

U.S. Cl. 123—73 PP **3 Claims**



1. An internal combustion engine comprising:

a cylinder having an exhaust port, several scavenging ports including a third scavenging port on the wall thereof;

a third scavenging passage being in communication with said third scavenging port;

a spraying nozzle mounted on said cylinder, an outlet of said spraying nozzle being positioned above said third scavenging port;

a device for admitting external air into said cylinder via said several scavenging ports; and

a piston that reciprocates within said cylinder, said piston being furnished with a gasifying chamber into which fuel is sprayed from said spraying nozzle, the only outlet therefrom being provided on the wall of said piston; and with the piston moving, said outlet being in alignment with said outlet of said spraying nozzle and said third scavenging port respectively.

4,708,101

DRIVING APPARATUS FOR INTAKE AND EXHAUST VALVES OF INTERNAL COMBUSTION ENGINE

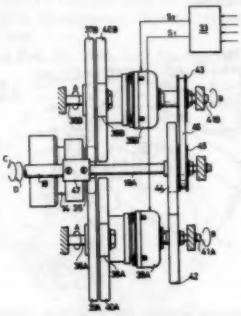
Seinosuke Hara, Yokosuka; Hiromichi Ofuji, Yokohama; Kazuyuki Miisyo, Yokohama; Yasuo Matsumoto, Yokohama, and Manabu Kato, Tokyo, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 18, 1985, Ser. No. 810,176

Claims priority, application Japan, Dec. 20, 1984, 59-269429; Apr. 19, 1985, 60-85086

Int. Cl.[4] F01L *1/34, 1/10, 1/18*

U.S. Cl. 123—90.16 **17 Claims**



1. An apparatus for driving a valve (12) of an internal combustion engine, comprising;

a valve lift controlling means connected to said valve (12) to control the lift of said valve (12) in response to the engine operating conditons;

a valve driving cam (13) fixed on a first cam shaft (14) and being in contact with said valve lift controlling means (15); and

a phase controlling means (23) arranged on said first cam shaft (14) to control the rotational phase of said valve driving cam relative to the phase of the piston position in the engine.

4,708,102

ROLLER CAM FOLLOWER WITH POSITIVE LUBRICATION

Karl J. Schmid, Chicago, Ill., assignor to Navistar International Transportation Corp., Chicago, Ill.

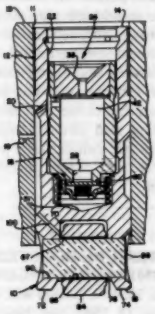
Filed Sep. 8, 1986, Ser. No. 904,723

Int. Cl.[4] F01M *9/10*

U.S. Cl. 123—90.35 **2 Claims**

1. In a roller cam follower of the type adapted to be reciprocated within a bore of an internal combustion engine, said

engine bore including a port operatively associated with a source of pressurized engine lubricating oil, said roller cam follower including an integral cylindrical body having an upper end and a lower end and an annular oil receiving exterior groove operatively associated with said engine bore port, and an enclosed recess opening through the lower end of said body including spaced side walls, a roller having a central bore disposed substantially within said recess with only a small



portion of the roller extending therefrom adapted to engage a cam, and a pin having a continuous cylindrical surface extending through said roller bore and into the side walls of said recess for journally mounting said roller, the improvement comprising a passage extending from said oil receiving groove through said side wall and into said recess above said pin, said passage being sufficiently small and disposed in said recess to direct a stream of pressurized lubricating oil into an entrance to said roller bore.

4,708,103

HYDRAULIC VALVE CLEARANCE COMPENSATION DEVICE

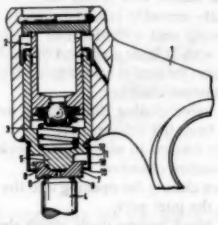
Walter Speil, Ingolstadt, Fed. Rep. of Germany, assignor to Motomak Motorenbau, Maschinen- und Werkzeugfabrik, Konstruktionen GmbH, Ingolstadt, Fed. Rep. of Germany

Filed Jun. 2, 1986, Ser. No. 869,432

Claims priority, application Fed. Rep. of Germany, Nov. 21, 1985, 3541198

Int. Cl.⁴ F01L *1/18*

U.S. Cl. 123—90.46 **6 Claims**



1. A hydraulic valve clearance compensation element comprising a hydraulic compensation element (2) in a bore of a rocker arm (1) or similar actuating mechanism extending coaxially from a stem (4) of an engine valve, a lonitudinally moveable adjusting piston (3) ending towards the valve stem (4) in a spherical projection (5) and between said projection and an end face (6) of the valve stem (4) a guide shoe (7,14) is arranged, comprising, on one side, a spherical cavity (8) which engages the spherical projection (5) of the adjusting piston (3) and, on an opposite side, being supported with a plane surface (9) on the end face (6) of the valve stem (4), characterized in that a cage portion (11) extends from the adjusting piston in a direction towards the valve stem (4) and ends adjacent the end face of the valve stem with radially inwardly directed locating portions (13), said portions juxtaposed about an outer surface (15) of the guide shoe (7,14) so that the guide shoe is securely held by the adjusting piston (3) and cage portion while being angularly freely moveable with respect to said piston.

4,708,104

REINFORCED PISTONS

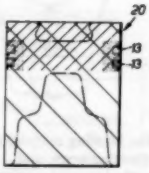
Roger A. Day, Lymington; Norman Tommis, Bradford, and Andrew R. Baker, Stretton-on-Dunsmore, all of England, assignors to AE Plc, Warwickshire, England

Continuation of Ser. No. 665,037, Oct. 26, 1984, abandoned. This application Mar. 3, 1987, Ser. No. 22,550

Claims priority, application United Kingdom, Oct. 26, 1983, 8328576

Int. Cl.⁴ B23P *15/10*

U.S. Cl. 123—193 P **17 Claims**



1. A method of manufacturing a reinforced piston for an engine or compressor and comprising:

preparing a reinforcement from fibres,

incorporating in a region of the fibre reinforcement, a finely divided particulate material, a further region not incorporating finely divided particulate material,

inserting said reinforcement incorporating said finely divided particulate material into a mould,

fill the mould with molten metal, and then

solidifying the molten metal under pressure so that the molten metal penetrates said region incorporating said finely divided particulate material and said further region not incorporating a finely divided particulate material to form a piston in which said region and said further region of the reinforcement provide different characteristics in respective different regions of the piston.

4,708,105

CHAMBER CONSTRUCTION FOR INTERNAL COMBUSTION ENGINE

George F. Leydorf, Jr., Birmingham, and Michael A. Pulick, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 23, 1985, Ser. No. 812,205

Int. Cl.⁴ F02F *1/10, 1/18*

U.S. Cl. 123—193 CH **14 Claims**

1. Construction for an internal combustion engine, comprising:

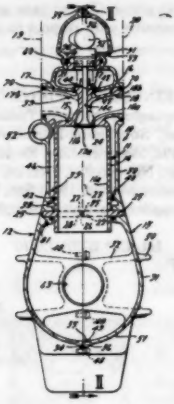
(a) a cast metal wear resistant monoblock having a bank of aligned cylinders with the axes of said cylinders lying in a common central plane and each having a top, said monoblock being closed at the top of said cylinders except for means permitting ingress and egress of combustion gases to or from said cylinders;

(b) a pair of cast metal complementary clamshell housing sections having margins mateable along said central plane, said sections being effective to support and envelope said monoblock in spaced relation therein to define a water jacket chamber having a top and a bottom, said sections having a cast-in-place oil passage system defined in and along the margins mateable at said central plane;

(c) means extending between said sections and monoblock to

seal said water jacket chamber against gas and water migration;

(d) means extending annularly about the monoblock and



received by the housing sections to transfer cylinder axial thrust loads therebetween; and

(e) means to fixedly join said sections together in said mated relationship.

4,708,106

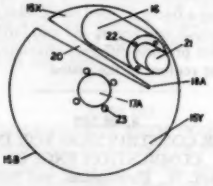
ACUTE ANGLE CRANKARM TRANSMITTING RECIPROCATING MOTION IN A ROTARY FASHION

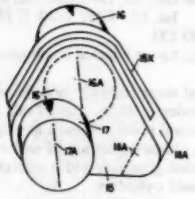
Joseph Giocastro; Peter Giocastro, and James Giocastro, all of 6428 Metropolitan Ave., Middle Village, N.Y. 11379

Continuation of Ser. No. 519,106, Aug. 2, 1983, Pat. No. 4,622,932. This application Jul. 7, 1986, Ser. No. 882,781

Int. Cl.[4] F02B *75/32*

U.S. Cl. 123—197 AC **7 Claims**





1. A crankarm system for translating the force of a piston of an internal combustion engine into rotating a crankshaft, comprising, in combination,

a crankpin connected to said piston,

a pair of spaced crankarms, each crankarm having a crankpin arm portion and a crankshaft arm portion, said crankpin arm portion having a crankpin end connected to said crankpin and an opposed connecting end, said crankshaft arm portion having a crankshaft end aligned with said crankshaft and an opposed connecting end, said crankpin arm portion and said crankshaft arm portion being connected at an angle at said connecting ends, means for connecting said crankarm to said crankshaft, wherein each of said crankarms is configured as a circular member having a center and perimeter, said crankshaft being positioned transverse to said circular member at said center, said crankpin being positioned transverse to said circular member proximate to said perimeter, an imaginary radial line extending between said center and said crankpin, said circular member forming a V-cut extending from said perimeter between said center and said crankpin past said radial line dividing said circular member into an outer portion relative to said center and a primary portion containing said center, said center portion being said crankshaft arm portion.

4,708,107

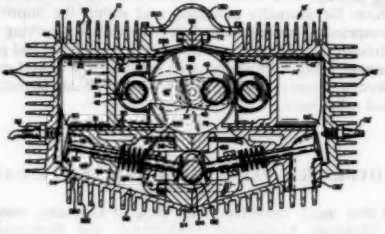
COMPACT PRESSURE-BOOSTED INTERNAL COMBUSTION ENGINE

Donald E. Stinebaugh, 2320 N. Corbin Rd., Post Falls, Id. 83854

Filed Aug. 15, 1985, Ser. No. 766,908

Int. Cl.[4] F02B *75/02, 75/24*

U.S. Cl. 123—317 **6 Claims**



1. A four-stroke cycle internal combustion engine, comprising:

an engine block;

a cylinder defined in said engine block;

a piston having a cylindrical sleeve and a face closing one end of the sleeve, said piston being slidably received and reciprocally movable in said cylinder;

a head closing said cylinder and defining a combustion chamber with at least a portion of the face of said piston;

an exhaust port formed in said engine block and opening into the combustion chamber;

an exhaust valve closing the opening into the combustion chamber from the exhaust port;

an inlet port formed in said engine block and opening into the combustion chamber;

an inlet valve closing the opening into the combustion chamber from the inlet port;

said engine block having walls which define a first semicylindrical chamber, the cylinder opening into into the first semicylindrical chamber;

a crankshaft journaled in the first semicylindrical chamber, said crankshaft having an axis essentially perpendicular with an axis of said piston

a first closure enclosing said crankshaft in the first semicylindrical chamber of said engine block and forming therewith an enclosed crankcase;

a connecting rod coupling said piston to said crankshaft, said piston driving said crankshaft;

a second chamber defined in said engine block and extending along a side of the cylinder, said inlet valve and said

exhaust valve each having a stem extending into said second chamber, said inlet port having an opening into said second chamber;

said engine block having a second closure forming a reservoir within said second chamber;

a throttle valve mounted in said engine block in an opening between the inlet port and the reservoir;

a camshaft journaled in said engine block at one end of the reservoir, said camshaft having an axis essentially parallel with the axis of said crankshaft, said camshaft being coupled to said crankshaft to operate said inlet valve and said exhaust valve in the four-stroke cycle, said reservoir surrounding said camshaft in the second closure;

said engine block having an inlet passage formed in a wall defining the crankcase, and an outlet passage formed in a wall between the crankcase and the reservoir, said passages extending longitudinally with respect to the semicylindrical chamber forming a length of the crankcase to be substantially that of the crankcase, each of said passages having mounted therein a valve body including a plurality of reed-valve members in normal positions closing the passages and movable by pressure to positions opening the passages; and

means for supplying working fluid to the inlet passage of the crankcase, the working fluid being forced into the crankcase during an upstroke of said piston and compressed in the crankcase during a downstroke of said piston, the compressed working fluid being forced from the crankcase into the reservoir during each said downstroke, and into the combustion chamber under control of said intake valve and said throttle valve during intake downstrokes of said piston.

4,708,108

METHOD AND SYSTEM FOR IDLE SPEED CONTROL

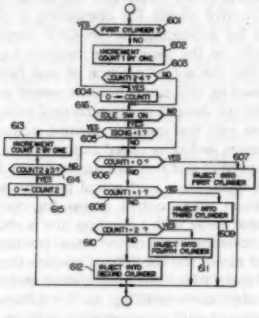
Masahide Sakamoto, Katsuta, and Masami Shida, Mito, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 20, 1986, Ser. No. 920,424

Claims priority, application Japan, Oct. 21, 1985, 60-233276

Int. Cl.[4] F02M *3/00*

U.S. Cl. 123—339 **7 Claims**



1. A method of controlling the idle speed of an internal combustion engine comprising a crank angle sensor for detecting the rotations of the internal combustion engine, an air flow sensor for detecting the flow rate of air supplied to said engine, fuel supply means for controlling the amount of fuel supplied to the engine, a sensor for detecting that the engine is in an idle state, means for effecting a feed-back control of an idle rotation speed to a predetermined value by controlling the amount of air supplied to the engine, and an electronic control unit capable of detecting an abnormal idle speed cotrol condition in which the engine speed exceeds a predetermined value in the idle state on the basis of electrical signals from said sensors, said method comprising the steps of counting the number of times fuel is supplied to the engine when the electronic control unit detects said abnormal idle speed control condition and suspending the fuel supply to at least one cylinder of the engine each time the count reaches a predetermined value.

4,708,109

APPARATUS FOR CONTROLLING AN IDLE SPEED OF AN INTERNAL COMBUSTION ENGINE

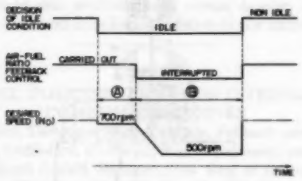
Mitsunori Takao, Kariya, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 8, 1986, Ser. No. 883,308

Claims priority, application Japan, Jul. 9, 1985, 60-150905

Int. Cl.[4] F02D *41/16*; F02M *3/07*

U.S. Cl. 123—339 **4 Claims**



1. An apparatus for controlling an idle speed of an internal combustion engine comprising:

an oxygen sensor disposed in a flow of an exhaust gas from the engine, said sensor outputting a signal corresponding to a concentration of residual oxygen in the exhaust gas;

means for varying an air-fuel ratio of a mixture to be supplied to the engine;

means for feedback controlling said varying means to make the air-fuel ratio closer to a desired air-fuel ratio in response to the signal from said oxygen sensor;

means for sensing a condition of the engine and outputting a signal corresponding thereto;

means for deciding whether or not said feedback control means is to be executed in response to the signal from said sensing means;

means for detecting an idle condition of the engine;

means for adjusting a flow rate of said mixture;

means for driving said adjusting means according to a decision of said deciding means when said detecting means detects the idle condition of the engine,

said driving means including

means for detecting the speed of the engine, means for setting a desired speed under the idle running of the engine in response to said detecting means,

means for calculating the speed difference between the engine speed detected by said speed detecting means and the desired speed set by said desired speed setting means when the idle running condition is detected by said idle condition detecting means,

means for setting a controlled variable in response to the speed difference obtained by said calculating means,

means for controlling a manipulated variable of said adjusting means in response to the controlled variable set by said controlled variable setting means; and

wherein the desired speed obtained by said desired speed setting means under a condition where said feedback control means is not carried out is set lower than that obtained under a condition where said feedback control means is carried out.

4,708,110

VALVE ARRANGEMENT

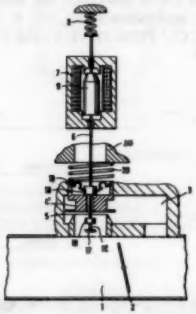
Stephan Wietschorke, Usingen; Gerhard Ruschek, Hattersheim, and Andreas Sausner, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 640,413, Aug. 13, 1984, Pat. No. 4,662,334. This application Sep. 2, 1986, Ser. No. 903,009

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1983, 3328949

Int. Cl.[4] F02M *3/06*

U.S. Cl. 123—339 **4 Claims**



1. In a valve arrangement for regulating the idling speed of an internal combustion engine by controlling the quantity of air passing from an inlet side to an engine intake of an intake manifold leading to the internal combustion engine, having an electromechanical control member which has a solenoid for moving a closure member via a control element against the force of a return spring, the improvement comprising:

a valve passage connecting said inlet side to said engine intake side of said intake manifold, and wherein

said closure member is movably disposed with respect to said valve passage so as to change the condition of opening of said valve passage, and said closure member is movable relative to the control element between a position of rest and an operating position of said closure member, the valve arrangement further comprising

means for holding said closure member in its position of rest, in a well-defined partially open condition of the valve passsage, and wherein

said solenoid has a movable armature,

said control element comprises a push rod connected to said movable armature, and

said holding means includes a first stop secured on said push rod, said closure member resting against said stop in the position of rest whereby said stop holds said closure member in a correct position for said well-defined partially open condition of the valve passage,

a second stop fixedly mounted on said push rod,

said closure member is displaceably mounted on said push rod between said stops, and

a snap spring connecting said first stop to said closure member wherein, on a first side of a snapping point of the snap spring said closure member is brought against said first stop by said snap spring for the position of rest, and

on an other side of the snapping point said closure member is brought against said second stop for the operating position.

4,708,111

ELECTRONICALLY CONTROLLED FUEL INJECTION BASED ON MINIMUM TIME CONTROL FOR DIESEL ENGINES

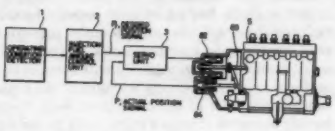
Makoto Shiozaki, Kariya, and Ichiro Akahori, Anjo, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Sep. 19, 1985, Ser. No. 777,683

Claims priority, application Japan, Sep. 19, 1984, 59-197588; Sep. 20, 1984, 59-198249

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—357 **5 Claims**



1. A system for controlling a fuel quanity to be injected into each cylinder of a diesel engine by a fuel injection pump, comprising:

an actuator coupled to said fuel injection pump;

fuel adjustment means, operatively coupled to said fuel injection pump and responsive to an energization of said actuator, for adjusting a quanity of fuel to be injected into said cylinder of said diesel engine;

actual position sensor means for sensing an actual position of said fuel adjustment means and generating a signal indicative of said actual position;

second sensor means for sensing engine operating parameter and producing signals indicative thereof;

means for detecting an operating condition of said engine in accordance with the sensed engine operating parameters;

fuel quantity control means for calculating a fuel quantity necessary for the detected engine operating condition and for generating a signal indicative of a desired position of said fuel adjustment member corresponding to the calculated fuel quantity;

servo control means responsive to said signal from said actual position sensor means and said signal from said fuel quantity control means for computing a control input value and for producing on ON-OFF control signal to said actuator on the basis of the computed control input value so that the actual position of said fuel adjustment means sensed by said actual position sensor means is coincident with the desired position thereof indicated by said signal from said fuel quantity control means, said servo control means including speed estimation means for estimating a speed of said fuel adjustment means by differentiating said signal from said actual position sensor means and minimum time control means for computing said control input value with a function that is obtained on the basis of a deviation between the actual position of said fuel adjustment means and the desired position thereof, and the estimated speed of said fuel adjustment means and with a current value corresponding to the obtained function being compared with a current passing through said actuator.

4,708,112

ELECTRONIC GOVERNOR FOR AN INTERNAL COMBUSTION ENGINE

Hirotoshi Nanjyo, and Hidetoshi Suzuki, both of Shizuoka, Japan, assignors to Kokusan Denki Co. Ltd., Numazu, Japan

Filed Jul. 10, 1986, Ser. No. 884,049

Claims priority, application Japan, Jul. 11, 1985, 60-151280; Jul. 30, 1985, 60-168190

Int. Cl.[4] F02D *41/38*

U.S. Cl. 123—357 **7 Claims**

1. An electronic governor for an internal combustion engine provided with a fuel injection pump for supplying fuel to the

engine and having a control rack for adjusting fuel injection amount, said electronic governor comprising,

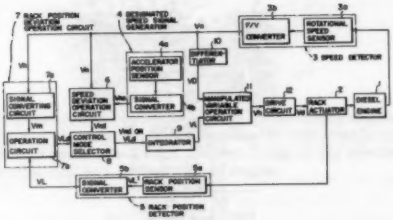
means providing a designated speed signal Vno indicative of the desired rotational speed No fo the internal combustion engine,

a speed detector detecting the rotational speed N of the internal combustion engine and producing the speed detection signal Vn indicative of the rotational speed N,

a rack position detector detecting the position of the rack and producing a rack position detection signal VL indicative of the position of the rack,

a speed deviation operation circuit responsive to the speed detection signal Vn for producing a constant speed control signal Vnd for effecting control to maintain the deviation of the actual rotational speed N from the designated rotational speed No within a permissible range,

a rack position deviation operation circuit resposive to the speed detection signal Vn and the rack position detection signal VL for producing a maximum rack position control signal VLd for effecting control to maintain the deviation



of the rack position from the maximum rack position for the particular rotational speed N within a permissible range,

a control mode selector responsive to the constant speed control signal Vnd and the maximum rack position control signal VLd for producing the constant speed control signal Vnd when the speed detection signal Vn is not smaller than the designated speed signal Vno, producing the constant speed control signal Vnd when the speed detection signal Vn is smaller than the designated speed signal Vno and the rack position is below the maximum rack position, and producing the maximum rack position control signal VLd when the speed detection signal Vn is smaller than the designated speed signal Vno and rack position is above the maximum rack position, and

means responsive to the output of the control mode selector for controlling the rack to cause the deviation of the actual rotational speed N from the designated rotational speed No or the rack position from the maximum rack position to be within a certain range.

4,708,113

METHOD OF DISCRIMINATING OCTANE NUMBER OF FUEL FOR MOTOR VEHICLE

Osamu Harada; Yuji Takeda; Toshio Suematsu; Katsushi Anzai, and Kazuhiko Funato, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed May 2, 1987, Ser. No. 729,809

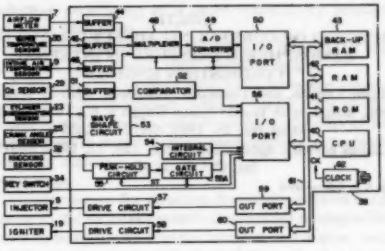
Claims priority, application Japan, Sep. 28, 1984, 59-203045; Sep. 28, 1984, 59-203046; Oct. 1, 1984, 59-206030

Int. Cl.[4] F02P 5/15

U.S. Cl. 123—425 **28 Claims**

1. A method of discriminating an octane number of fuel for motor vehicle having an electronic ignition timing control system wherein a basic ignition advance angle is determined in accordance with an engine operational condition so as to be optimum for a predetermined octane number and is corrected by using a correction value for retardation of the ignition timing, said correction value calculated in accordance with a knocking condition of an engine, said method comprising the steps of:

determining whether said correction value is within a reference range of the correction value; and



determining whether an octane number to fuel being supplied to the engine is within an allowable range with respect to said predetermined octane number in accordance with said knocking condition of the engine.

4,708,114

FUEL INJECTION PUMP POR INTERNAL COMBUSTION ENGINES

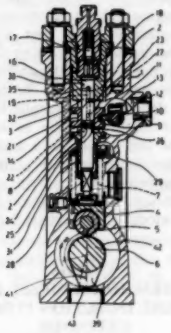
Josef Güntert, Gerlingen; Walter Häfele, Fellbach, and Helmut Tschöke, Ostfildern, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Nov. 21, 1985, Ser. No. 800,629

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1984, 3447374

Int. Cl.[4] F02M 59/34

U.S. Cl. 123—449 **20 Claims**



1. A fuel injection pump for internal combustion engines comprising at least one pumping unit provided with a pump cylinder having a wall and a pump piston having an opening on a jacket face thereof, said pump cylinder and said pump piston further including an axis and arranged to define a pump work chamber, a control slide axially displaceable on said pump piston, said slide adapted to control a quantity control conduit located in said pump piston, said quantity control conduit arranged to communicate with said pump work chamber, a connecting conduit leading to a chamber of lower pressure controlled by said pump piston independently of said control slide, said pump cylinder wall further provided with an entrance therein that is capable of being covered by said pump piston and said pump piston further including a relief conduit adatped to communicate with said pump work chamber, whereby after a predetermined compression stroke of said pump piston has been traversed, said opening of said relief

conduit is adapted to uncover said entrance of said connecting conduit, and said opening of said relief conduit is arranged to emerge from said pump cylinder at least at bottom dead center of said pump piston.

4,708,115

METHOD OF CORRECTING AIR-FUEL RATIO FOR ATMOSPHERIC PRESSURE IN INTERNAL COMBUSTION ENGINES

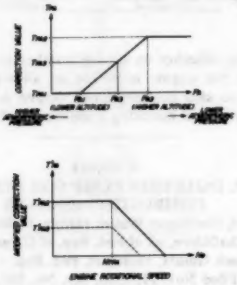
Akihiro Yamato, and Takafumi Nishikawa, both of Wako, Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Jan. 21, 1987, Ser. No. 5,638

Claims priority, application Japan, Jan. 22, 1986, 61012353

Int. Cl.[4] F02D *41/34*

U.S. Cl. 123—494 **5 Claims**



1. A method of correcting the air-fuel ratio of an air-fuel mixture to be supplied to an internal combustion engine for atmospheric pressure in which an amount of fuel to be supplied to the engine is determined in dependence upon operating conditions of the engine and the determined amount of fuel is corrected by a correction value that depends upon atmospheric pressure, the method comprising the steps of:

setting said correction value in dependence on atmospheric pressure in a manner such that the correction value increases with a decrease in atmospheric pressure;

modifying the set correction value in dependence on rotational speed of said engine in a manner such that the correction value decreases with a rise in the rotational speed of said engine; and

correcting the amount of fuel to be supplied to said engine by adding the modified correction value thereto.

4,708,116

INJECTION SYSTEM FOR A DIESEL ENGINE WITH A HIGH PRESSURE INJECTION PUMP FOR EACH CYLINDER

Roland Gau, Möglingen, and Richard Klazel, Stuttgart/Feurbach, both of Fed. Rep. of Germany, assignors to Motoren-Werke Mannheim Aktiengesellschaft, Mannheim, Fed. Rep. of Germany

Filed Feb. 19, 1986, Ser. No. 830,951

Claims priority, application Fed. Rep. of Germany, Feb. 23, 1985, 3506392

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—506 **18 Claims**

1. In a fuel injection system for a diesel engine of the type having an injection pump for each of a plurality of combustion cylinders, each pump having a housing containing a low pressure fuel supply chamber and a high pressure pump chamber in which fuel is subjected to a fuel injection pressure by a reciprocating pump piston whereby fuel is delivered to an injection nozzle, the combination comprising:

an arrangement for modifying the fuel delivery of each of said injection pumps including

a delivery control valve in each pump including

wall means defining a spool bore,

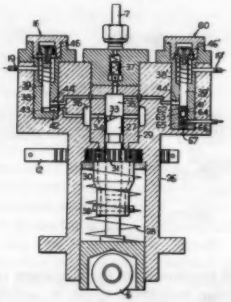
an axially shiftable delivery control spool in sealing relation with said bore, the end surface of one end of said delivery control spool and said spool bore defining a low pressure chamber,

a low pressure passage connecting said low pressure chamver in fluid communication with said fuel supply chamber,

wall means defining a servopressure chamber at the other end of said delivery control spool,

a high pressure passage in said pump connecting said high pressure pump chamber to said spool bore at a point spaced a first predetermined axial distance from the connection of said low pressure passage to said low pressure chamber,

said delivery control spool being axially shiftable between a first fluid flow control position in which it closes said



high pressure passage at said spool bore and a second fluid flow control position in which said high pressure passage is partially open at said piston bore whereby it is in fluid communication with said low pressure chamber,

biasing means axially urging said delivery control spool to its second axial position, and

a pressure fluid supply system independent of fuel supplied to said supply chamber operable to supply pressure fluid to said servopressure chamber including a solenoid valve having a first fluid flow control position in which a first level of pressure is effected in said servopressure chamber causing said delivery control spool to be in its first position and having a second fluid flow control position in which a second level of pressure is effected in said servopressure chamber permitting said biasing means to cause said delivery control spool to be in its second position of adjustment whereby actuation of said solenoid valve effects termination of fuel delivery of said pump.

4,708,117

MULTI-POINT FUEL INJECTION APPARATUS

Gerhard Mesenich, Bochum, Fed. Rep. of Germany; Hansueli Bart, and Daniel E. Alsbrook, both of Mt. Clemens, Mich., assignors to Colt Industries Inc., New York, N.Y.

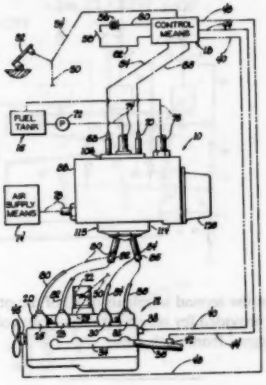
Filed Apr. 14, 1986, Ser. No. 851,567

Int. Cl.[4] F02M *23/00*

U.S. Cl. 123—533 **37 Claims**

1. Improvement in apparatus for the uniform distribution of fuel to a multi-cylinder combution engine having a plurality of conduits respectively leading to the induction passages of respective ones of said cylinders of said engine, said improvement comprising a fuel metering valve assembly arranged to deliver metered quantities of fuel in accordance with the requirements of the cylinders of the engine, means defining fuel chamber means for receiving unmetered fuel without any air

added thereto, a plurality of passages extending from said fuel chamber means one for each cylinder of the engine, respective ones of said passages being connected through respective ones of said conduits to the induction passage of respective ones of



said cylinders of said engine, and means for admitting superatmospheric air to only an area downstream of said passage and upstream of each said conduit for conveying of the metered fuel exiting each said passage to said engine.

4,708,118

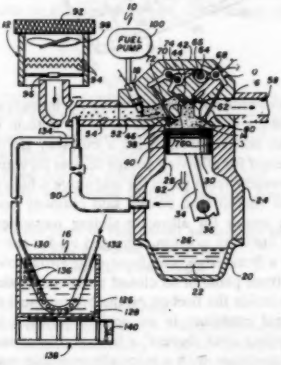
FUEL INJECTED INTERNAL COMBUSTION ENGINE POLLUTANT CONTROL SYSTEM

Kelly R. Rawlings, Big Bear Lake, Calif., assignor to Anti-P, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 853,425, Apr. 23, 1986, which is a continuation-in-part of Ser. No. 729,656, May 2, 1985, abandoned. This application Jul. 3, 1986, Ser. No. 881,724

Int. Cl.[4] F02M *25/00, 31/12*

U.S. Cl. 123—555 **19 Claims**



1. A fuel injected internal combustion engine, comprising:

an air intake apparatus having at least one resistance heating element capable of heating air passing therethrough to a temperature within a range of 160° F. to 180° F., and an air temperature sensing means situated downstream of the resistance heating element to control the temperature of the heating element;

combustion chamber means including a primary combustion chamber and a contiguous pre-combustion chamber wherein a sparkplug is situated, the combustion chamber means further including a primary intake port to the primary combustion chamber and an auxiliary intake port to the pre-combustion chamber, as well as an exhaust port to the primary combustion chamber, wherein passage of air/fuel or exhaust through the ports is controlled by the selective positioning of a valve respectively positioned adjacent each port;

air intake manifold means for directing air from the air intake apparatus to the combustion chamber means;

a free-wheeling fan situated within the air intake apparatus to increase the turbulence of the air drawn through the air intake manifold means, whereby mixing of the air and fuel is enhanced to improve combustion within the combustion chamber means;

a fuel pump;

fuel injector means for directing fuel received from the fuel pump to the air intake manifold means for mixing with air prior to being drawn into the combustion chamber means, the fuel injector means including means for heating and vaporizing fuel passing therethrough to produce a predetermined mixture of approximately 30% liquid fuel and 70% vaporized fuel by volume for injection into the air intake manifold means, the fuel heating and vaporizing means including a resistance heating element and a heat sink which defines a fuel heating reservoir situated generally adjacent an inlet of the fuel injector means, and fuel temperature sensing means which, in connection with a thermister controlling electrical input to the resistance heating element, regulates the temperature of the heat sink to maintain the temperature of the fuel exiting the fuel heating reservoir within the range of 115° F. to 125° F.;

a flow constricting valve in the proximity of the fuel injector means inlet, to help vaporize and increase turbulence of the fuel as it enters the fuel heating reservoir; and

means for injecting a menthanol/water vapor mixture into the air intake manifold means, including a methanol/water storage container, a methanol/water vapor passageway from the storage container to a positive crankcase ventilation line, and means for cooling the methanol/water mixture within the storage container utilizing a cooling heat sink situated generally adjacent the storage container and a blower for expediting transfer of heat from the heat sink to the atmosphere.

4,708,119

INTERNAL COMBUSTION ENGINE HAVING A MECHANICAL SUPERCHARGER

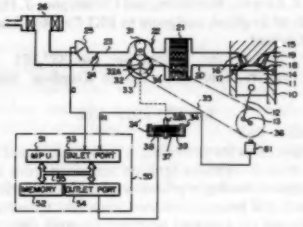
Takashi Miyake, Aichi, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Nov. 6, 1986, Ser. No. 927,592

Claims priority, application Japan, Nov. 9, 1985, 60-249968

Int. Cl.[4] F02B *33/38*

U.S. Cl. 123—559 **5 Claims**



1. An internal combustion engine including a mechanical supercharger, which is connected to a crankshaft of the engine via a clutch and selectively turned ON or OFF by controlling the clutch, said engine comprising means for detecting a revo-

lutional speed of the engine, means for detecting a load of the engine, means for detecting the ON/OFF condition of the mechanical supercharger, and a control means for changing the mechanical supercharger from an OFF to an ON condition only when the engine is running at a speed that is not more than a first predetermined engine revolutional speed and at a load that is not less than a first predetermined engine load, and changing the supercharger from an ON to an OFF condition only when the engine is running at a speed lower than a second predetermined engine revolutional speed and at a load lower than a second predetermined engine load.

4,708,120

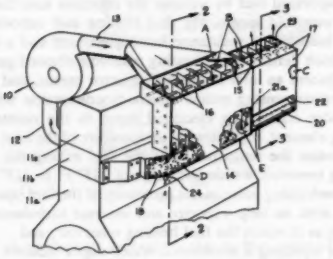
APPARATUS AND METHOD FOR TREATING AIR FROM A TURBOCHARGER

David O. Mann, Hamilton, Ind., assignor to Mann Technology Limited Partnership, Greenville, S.C.

Filed Mar. 17, 1986, Ser. No. 840,040

Int. Cl.[4] F02B *29/04*

U.S. Cl. 123—563 **11 Claims**



1. Apparatus for cooling and removing moisture from compressed air passing from a turbocharger and the like to an intake of an engine comprising:

an air duct connecting the turbocharger to the intake of the engine;

a plurality of heat pipes extending across said air duct for receiving heat from said compressed air passing through said air duct;

a portion of said heat pipes extending from said air duct into a zone of ambient air external to said air duct for transferring heat received from said compressed air to said ambient air thus cooling said compressed air; and

a lower extension of said air duct forming a coalescer zone receiving said compressed air after cooling by said heat pipes extending across said air duct for removing moisture therefrom.

4,708,121

ENGINE ANALYSERS

Geoffrey J. Everett, Berkshire, and Christopher J. Hunt, Somerset, both of England, assignors to FKI Crypton Limited, Somerset, England

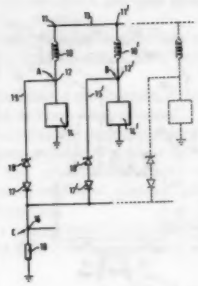
Filed Mar. 7, 1986, Ser. No. 837,351

Claims priority, application United Kingdom, Mar. 7, 1985, 8505874

Int. Cl.[4] F02P *1/08*

U.S. Cl. 123—643 **12 Claims**

3. An apparatus for providing a composite signal identifying the start of each cylinder ignition sequence from a multi-coil ignition system having a plurality of coils, the primary windings of each coil being connected via a first terminal to a voltage supply and via a second terminal, through switch means, to earth; said apparatus comprising a plurality of leads, a separate lead for each coil, each of said leads being adapted to be connected at one end to the second terminal of a different one of said coils and at the other end to a common terminal, means being incorporated in each lead to permit the passage of a signal from the second terminal of the coil to which it is connected to the common terminal, while isolating the second



terminal from the second terminals of all of the other coils and means being provided for removing the supply voltage component of the signal from each coil.

4,708,122

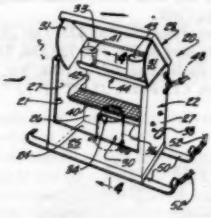
ALCOHOL OUTDOOR PORTABLE STOVE AND ACCESSORIES

Henry L. Rock, 2576 S. Van Dyke, Marlette, Mich. 48453

Filed May 5, 1986, Ser. No. 859,380

Int. Cl.[4] F24C *5/00*

U.S. Cl. 126—43 **8 Claims**



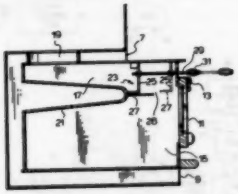
1. An alcohol outdoor portable stove for hunters and fisherman comprising a hollow firebox having a bottom wall, front and backwalls and sidewalls with a cutaway portion in the front wall thereof for allowing escape of heat forwardly of said stove, a removeable front panel for said stove which mounts on the front wall thereof and covers said cutaway portion, said panel having means for allowing sliding movement up and down in said cutaway portion, a hinged lid for the top of the stove having a front edge, said front edge fitting over the top edge of said front panel in its closed position, an alcohol container, means inside the firebox on the bottom wall thereof for supporting said container in an upright position to prevent accidental tipping over thereof, a heat regulator mounted on said alcohol container with a manually operable rod attached thereto and extending through a sidewall of said firebox for controlling the air supply to said container for regulating the heat put out by said stove, side panels mounted to the underside of said lid and moveable therewith so as to be accomodated in the firebox when said lid is closed and which prevent lateral heat excape from said stove when the lid is in its open position whereby, upon lighting of the alcohol in said container, heat in copious amounts will escape from the front of the stove and provide ample warmth for the hunter or fisherman.

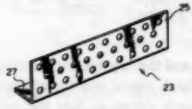
4,708,123

WOOD BURNING STOVE

Steve Strnad, 4173 Rayfield Crt, Mississauga, Ontario, Canada (L4Z 1E6)

Filed Nov. 19, 1986, Ser. No. 932,293
Int. Cl.[4] F23L *3/00*
U.S. Cl. 126—289 4 Claims





1. A wood burning stove comprising an internal combustion region having front and rear walls with a double baffle extending generally horizontally forwardly from said rear wall to divide said internal combustion region in to a lower fuel receiving chamber and an upper chamber leading to an exhaust flue located thereabove, said baffle having heat transfer surfaces in both of said chambers and terminating short of said front wall leaving a passage between said lower and upper chambers, a damper plate movable between a passage closed chamber dividing and a passage open chamber joining position, said damper plate having a perforated portion to allow limited flame travel therethrough when in the chamber dividing position, and a door for gaining access through said front wall to said internal combustion region at said passage between said lower and upper combustion chambers, said damper plate when in the chamber joining position acting as a smoke guide to guide smoke to the inside of said stove when said door is opened.

4,708,124

CONTROL OF HYDROGEN PERMEATION ESPECIALLY IN SOLAR COLLECTORS

Leo R. Dorbeck, Campbellville, Canada, assignor to Canadian Sun Systems Ltd., Campbellville, Canada

Filed Apr. 17, 1981, Ser. No. 255,234
Claims priority, application United Kingdom, Apr. 21, 1980, 8013032
The portion of the term of this patent subsequent to Nov. 24, 2002, has been disclaimed.
Int. Cl.[4] F24J *3/02*
U.S. Cl. 126—438 7 Claims

1. In a solar collector, comprising

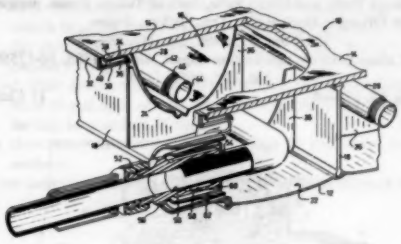
an evacuated enclosure having a transparent upper surface,

at least one elongate focussing reflector located in said enclosure to receive light through the transparent upper surface and focus the same, and

an absorber tube normally located at the focus of the reflector for conveying an aqueous fluid to be heated into the compartment and for removing heated fluid from the compartment,

the improvement wherein:

said absorber tube comprises an inner tubular member having an inner surface and an outer surface and constructed of ferritic material, an outer tubular member having an inner surface and an outer surface and being in heat conducting relationship with said inner tubular member, and means preventing gaseous material from passing through



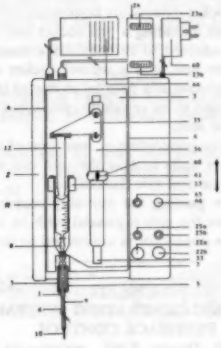
the absorber tube from said fluid to said evacuated enclosure.

4,708,125

APPARATUS FOR CONTROLLING A PROBE OF AN ENDOSCOPY DEVICE

Sinisa Miketi; Udo Schade, both of Kassel, and Michael Schade, Solingen, all of Fed. Rep. of Germany, assignors to Messrs. Karl Storz GmbH & Co., Fed. Rep. of Germany

Filed Jul. 21, 1986, Ser. No. 887,631
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1985, 3526434
Int. Cl.[4] A61B *1/00*
U.S. Cl. 128—4 11 Claims



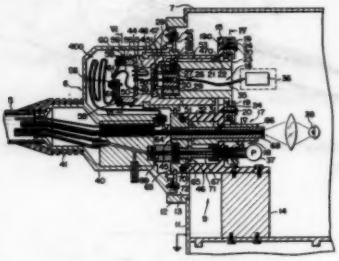
1. Apparatus for controlling a probe, which has a sheathing, of an endoscopy device, wherein at its one end the probe has a movable medical instrument while at its other end it has an operating member, and also has an actuating element which extends through the sheathing and which is connected to the operating member and the instrument, characterised by a housing (2), a first receiving means (5, 56, 57) fixed thereto for securing the sheathing (6), a slide (3) which is mounted displaceably in opposite directions in the housing (2), a second receiving means (7, 58) which is fixed to the slide (3) for securing the operating member (8, 53), a first drive means (14) mounted in the housing (2) for automatically displacing the slide (3) in both directions and a switching means (23*a*, *b*; 25*a*, *b*) for selectively switching on the drive means (14) in one direction or the other.

4,708,126

ENDOSCOPIC APPARATUS WITH CONNECTING MEANS

Masato Toda, and Hisao Yabe, both of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jul. 11, 1986, Ser. No. 884,757
Claims priority, application Japan, Aug. 9, 1985, 60-175502
Int. Cl.[4] A61B 1/06
U.S. Cl. 128—6 **11 Claims**



1. An endoscopic apparatus comprising:

an endoscope body including an operating section, an insertion section extending from the operating section and adapted to be inserted into the body cavity, a universal cord extending from the operating section, and a connector attached to the extending end of the universal cord, said connector including a first connector unit with a central axis for an optical system, and a second connector unit having a central axis substantially parallel to that of the first connector unit, and spaced at a predetermined distance from the first connector unit;

a drive unit for driving the endoscope body, said drive unit including a socket detachably connected with the connector, said socket including a first socket unit having a central axis and adapted to be coaxially connected with the first connector unit, and a second socket unit having a central axis substantially parallel to that of the first socket unit and adapted to be coaxially connected with the second connector unit;

support means for supporting at least one of the connector units or socket units so that the unit can move at right angles to the central axis thereof; and

guide means for guiding the movably supported unit to a position where the unit is coaxial with its corresponding unit when the connector is connected to the socket.

4,708,127

ULTRASONIC GENERATING SYSTEM WITH FEEDBACK CONTROL

Ali A. Abdelghani, Duarte, Calif., assignor to The Birtcher Corporation, El Monte, Calif.

Filed Oct. 24, 1985, Ser. No. 790,744
Int. Cl.[4] A61H 1/00
U.S. Cl. 128—24 A **20 Claims**

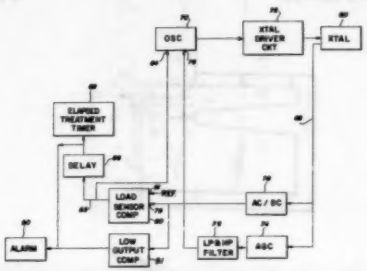
1. In an ultrasonic generating system for treating living tissue, the combination which comprises:

(a) electrically oscillating means having an input and output and arranged to produce an oscillating signal in the output which has the same frequency as the signal on the input thereof and a phase relationship with respect thereto of $n \times 180°$, where n is an integer;

(b) a piezoelectric crystal for translating ac energy into mechanical vibrations and vice versa, the crystal having excitation electrode means for receiving the ac energy and feedback electrode means for providing a feedback signal representative of the vibrations induced in said crystal;

(c) means for coupling the output of the oscillating means to the excitation electrode means of the crystal; and

(d) feedback means including filter means connected between the feedback electrode means and the input of the oscillating means to provide a closed loop around the



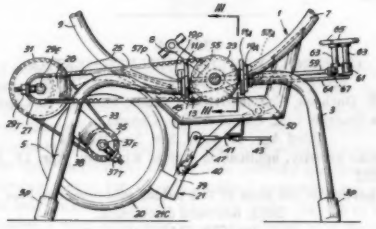
oscillating means and the crystal, for filtering out harmonics from the feedback signal and for adjusting the amplitude of the feedback signal so that the gain around the loop is approximately unity; whereby the frequency means is slaved to the resonant frequency of the crystals.

4,708,128

STATIONARY BICYCLE WITH INCLINABLE PEDAL CRANK AXES FOR TREATING KNEE ANOMALIES

Enrico Ancillotti, Viale M. Fanti 9/A, 50137 Firenze, Italy

Filed Oct. 15, 1985, Ser. No. 787,765
Claims priority, application Italy, Oct. 26, 1984, 9525 A/84
Int. Cl.[4] A61H 1/02
U.S. Cl. 128—25 R **11 Claims**



1. A kinesitherapic apparatus for the resolution of "valgus" and "varus" knee anomalies of children and youths and for integrating therapies on grown-up people, comprising in combination a stationary cycle frame with a flywheel, means for braking said flywheel, independently mounted pedal cranks each mounted on said cycle frame for selectable tilting articulation about an axis extending generally horizontally in the fore and aft direction of said cycle frame, means coupled to said pedal cranks for selecting and determining said articulation, respective pedals journaled to said pedal cranks, means coupled to each pedal for positioning a foot on the corresponding pedal in alignment with the associated leg and means for connecting said pedal cranks with said flywheel to impart motion to said flywheel independent of said tilting articulation.

4,708,129

CERVICAL/OCCIPITAL SUPPORT

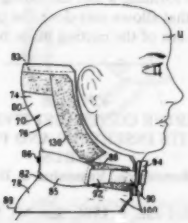
Charles Pujals, Jr., 119 Fayette St., Bridgeton, N.J. 08302

Continuation-in-part of Ser. No. 563,160, Dec. 19, 1983, Pat. No. 4,562,833. This application Jan. 7, 1986, Ser. No. 816,883

The portion of the term of this patent subsequent to Jan. 7, 2003, has been disclaimed.

Int. Cl.[4] A61F *5/01, 5/04*

U.S. Cl. 128—75 **20 Claims**



1. A cervical and occipital support for use in supporting a user's head and neck, comprising:

a semi-rigid preformed U-shaped shell fabricated of a solid, resilient material, contoured to fit the occipital bone area of the skull posterolaterally and the neck posterolaterally to the base of the neck having:

a first end portion having a first radius of curvature defining said U-shape for laterally supporting and cradling the occipital bone between the ears;

a central portion having a second radius of curvature smaller than said first radius of curvature for surrounding and contacting the posterior and lateral neck area from the sub occipital area to the base of the neck;

said central portion including forwardly extending portions which extend along the lateral portions of the user's neck forwardly of the user's ears, but which stop short of completely encircling the user's neck;

a first transition zone between said first end portion and said central portion spaced from said first end having a decreasing radius of curvature in the direction of said central portion for receiving and longitudinally supporting the occipital bone;

a second end portion having a third radius of curvature larger than said second radius of curvature for contacting and resting on the suprascapular region and contacting the base of the neck anteriorly and resting on the clavicles;

a second transition zone between said central portion and said second end portion and having an increasing radius of curvature in the direction of said second end; and

a retaining means selectively attachable to said support for extending around the exterior portion of the user's neck;

whereby said user's head and neck are supported by said support without completely immobilizing those areas and said solid material acts to retain the user's body heat.

4,708,130

LUMBAR DYNAMIC SPLINT

Charles M. Grudem, 6088 Foxtail Dr., White Bear Lake, Minn. 55110

Continuation-in-part of Ser. No. 702,384, Feb. 15, 1985. This application Aug. 18, 1986, Ser. No. 897,792

Int. Cl.[4] A61F *5/02, 5/04*

U.S. Cl. 128—78 **1 Claim**

1. A lumbar dynamic splint made of low temperature thermoplastic materials which are moldable to produce an exact contour fit to the patient's body, said splint comprising:

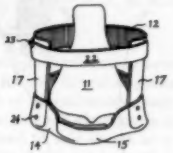
a vertical back piece, the lower portion of said back piece being wider than the upper portion, said back piece being of sufficient length to extend from the lower thoracic region to the sacrum and sacroiliac regions of most adult humans, said length being approximately 12 inches to 26 inches, inclusive:

a horizontal chest piece attached to the upper portion of said back piece, said chest piece having two ends, each of which is adapted to extend part way around the chest of the patient to approximately the level of the front of the patient's armpit;

two chest strap anchors attached to said chest piece, one at each of said ends of said chest piece, each of said anchors having an attached D-ring;

a chest strap attached to said D-rings of said chest strap anchors;

two lateral pelvic arms attached to the lower portion of said



back piece, said pelvic arms curving around and attaching to each other in front by overlapping Velcro means;

two vertical lateral struts attached to said chest piece and to said pelvic arms;

closed cell foam padding adhesively affixed to the inner surfaces of said back piece, said chest piece, said pelvic arms, and said struts;

said attachments of said chest piece to said back piece, of said chest strap anchors to said chest piece, of said pelvic arms to said back piece, and of said struts to said chest piece and to said pelvic arms, being made by means of screw posts inserted through any of a plurality of openings formed in said pieces, said multiple openings allowing adjustment of said splint to fit almost any size adult.

4,708,131

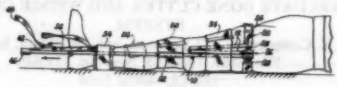
COLLAPSIBLE FEMUR TRACTION DEVICE

Richard L. Kendrick, 1573 Kimberly Woods, El Cajon, Calif. 92020

Filed Aug. 25, 1986, Ser. No. 899,729

Int. Cl.[4] A61F *5/04*

U.S. Cl. 128—85 **8 Claims**



1. A collapsible femur traction device for use applying traction to a leg with a broken femur, comprising:

(a) a thigh strap adapted to engage around the leg at the upper thigh;

(b) a hollow pole made of segments connected with an internal elastic cord and capable of being used with selected numbers of segments to achieve selected length, and means on said thigh strap said means engaging either one of said pole or the ends of two pole segments connected by said elastic cord, depending on the length selected, with a second end of said pole adapted to extend down along the leg beyond the foot;

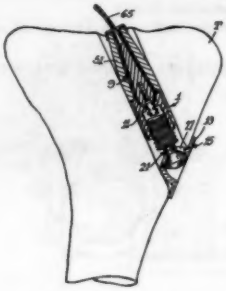
(c) a tensioning harness adapted to engage around the ankle and having means engaging the second end of said pole and tension the leg by pulling the foot and the second end of the pole together.

4,708,132

FIXATION DEVICE FOR A LIGAMENT OR TENDON PROSTHESIS

Thomas A. Silvestrini, East Lyme, Conn., assignor to Pfizer-Hospital Products Group, Inc., New York, N.Y.

Filed Jan. 24, 1986, Ser. No. 821,948
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—92 YF **18 Claims**



1. A device for the fixation of a pretensioned ligament or tendon prosthesis to a bone of a patient comprising:

a hollow elongated sleeve adapted to fit within a through drill hole in said bone and having a front end, a rear end, an inner wall defining a bore and an outer wall, with said bore being open at both the front and rear ends of the sleeve and tapered over a portion of its length with decreasing cross-sectional bore thickness, in at least one dimension, towards said front end;

a wedge capable of being inserted through the rear end of the sleeve and advanced forwardly into said tapered portion of the bore until coming to a position of abutment with said inner wall of the sleeve, with a pair of opposed faces on the outer surface of said wedge being, when the wedge is in said position of abutment, disposed within said tapered bore portion and substantially congruent with the adjacent surfaces of said inner wall;

means for locking the sleeve and the wedge together in a rigid assembly with the wedge in said position of abutment; and

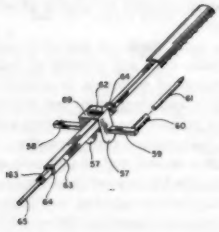
means for holding said rigid assembly to said bone in such a manner that said assembly cannot be pulled forwardly through said drill hole in the patient's bone.

4,708,133

ARCUATE BONE CUTTER AND WEDGE GUIDE SYSTEM

John E. Comparetto, 322 Freeman Ave., Audubon, Iowa 50025

Filed Apr. 10, 1985, Ser. No. 721,640
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—92 VY **11 Claims**



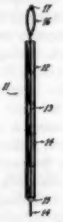
1. A bone cutter comprising a saw blade having a shank and an elongate body extending therefrom, said elongate body being curved in cross section and having saw teeth along an elongate edge, said shank capable of attachment to a reciprocating saw device which makes up and down strokes, said shank smoothly articulating within a housing means comprising a shaft for said shank articulation, said housing means also comprising a hole means within which a bone pin is placed, said hole means being capable of adjustable movement with respect to said shaft and therefore said saw blade shank, such adjustable movement being arbitrarily affixed by a set screw, and flute means forming a slot extending from an area of the housing means that allows said slot to be positioned at its inner extent over the arc of the cutting blade body.

4,708,134

INTRAUTERINE CONTRACEPTIVE DEVICE AND DEVICE FOR ITS INSERTION AND FIXATION TO THE UTERUS

Dirk A. A. Wildemeersch, Vossenhul 8, B-8300 Knokke-Heist, Belgium

Filed Jan. 9, 1986, Ser. No. 817,475
Claims priority, application Belgium, Feb. 5, 1985, 214449
Int. Cl.[4] A61F 5/46
U.S. Cl. 128—130 **12 Claims**



1. An intrauterine contraceptive device for a uterus, comprising:

a retaining means for anchoring said intrauterine contraceptive device in fundal tissue of said uterus;

a fixing means integral with said retaining means for inserting said retaining means in said fundal tissue; and

a plurality of hollow members affixed to said fixing means to form a non-rigid assembly, each of said plurality of hollow members having a passage therethrough and affixed to said fixing means end-to-end whereby said non-rigid assembly has a longitudinal passage formed therethrough, and wherein said plurality of hollow members are fabricated of a material active within said uterus to prevent pregnancy.

4,708,135

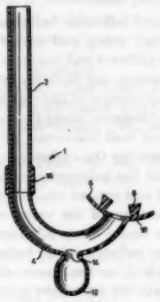
SNORKEL

Jan Arkema, 1755 Pharmacy Avenue, Agincourt, Ontario, Canada M1T 1H4

Filed Dec. 24, 1984, Ser. No. 685,870
Int. Cl.[4] A62B 7/00
U.S. Cl. 128—201.11 **13 Claims**

1. A snorkel, for use by a swimmer, the snorkel comprising: a mouthpiece; a breathing tube connected to the mouthpiece and including a portion adjacent the mouthpiece, which portion is lowermost in use; and a container defining a chamber for fluid, which is in communication only with said portion, said communication allowing fluid flow in either direction and which container is both sufficiently rigid to prevent collapse of the container, in use, from surrounding water pressure while enabling fluid entering the snorkel to accumulate in said cham-

ber to prevent passage of fluid to a user, and which is sufficiently resilient to enable the container to be collapsed to expel



accumulated fluid into said portion, to enable such accumulated fluid to be expelled by exhalation.

4,708,136

CAUTERY HEMOSTATIC UNIT

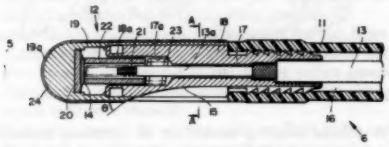
Tatsuya Saito, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 774,771, Sep. 11, 1985, abandoned. This application Feb. 6, 1987, Ser. No. 11,974

Claims priority, application Japan, Sep. 13, 1984, 59-192277; Jan. 11, 1985, 60-2700

Int. Cl.[4] A61B *17/36*

U.S. Cl. 128—303.1 **3 Claims**



1. A cautery hemostatic unit deliverable through a tool channel of an endoscope comprising:

(a) a tubular main body part having proximal and distal ends attached at its proximal end to a flexible sheath, said main body part having a through-hole in the direction of the central axis and a plurality of slotted longitudinal channels formed on the outer surface of the main body;

(b) an electrically energized heating means inserted into said through-hole at the distal end of said main body part;

(c) a tubular cap having a closed, hemispherical end and a plurality of slots open to the proximal end corresponding in number and radial position to said slots on said main body part, said cap having a non-adherent outer coating and an inner diameter sized so as to fit snugly over the distal portion of said main body part;

(d) means for detachably securing said cap on said main body part;

(e) means for electrically connecting said heating means to an external controller through said main body part and said sheath; and

(f) means for delivering a non-toxic liquid through said sheath to said slots in said main body part wherein said slots on said main body part terminate distally, with a gentle slope to the surface of the main body, at a point not less than the radius of curvature of the hemispherical portions of said cap from the distal extremity of the cap, said slope having an angle of curvature which directs said non-toxic liquid at an angle of not more than 20° to the longitudinal axis of said main body.

4,708,137

HIGH-FREQUENCY INCISION DEVICE

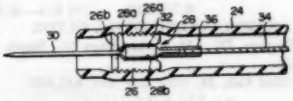
Tsuyoshi Tsukagoshi, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 14, 1986, Ser. No. 863,234

Claims priority, application Japan, May 20, 1985, 60-74816[U]; Sep. 17, 1985, 60-141806[U]

Int. Cl.[4] A61B *17/36*

U.S. Cl. 128—303.15 **8 Claims**



1. A high frequency incision device comprising: an elongated flexible sheath for insertion into a patient's body through an insertion channel of an endoscope; said sheath having a distal end, a proximal end and electrical insulating capability;

an end member fixed to said sheath at a location slightly removed from the distal end toward to proximal end of the sheath, the end member having a through hole extending in axial direction of the sheath;

a knife slidably inserted through the through hole, for incising a desired portion of tissue in the patient's body by means of a high-frequency current from a high-frequency power source, said knife having a stopper portion which is integrally formed with the knife and has a width greater than the minimum diameter of the through hole to restrict the extent of projection of the knife from the end member;

an operating wire movably inserted through the sheath, said wire having one end connected to the knife, and another end connected to the high-frequency power source for conducting high-frequency current from the high-frequency power source to the knife; and

means connected to the wire between the proximal end of the sheath and the power source, for advancing and retracting the knife with respect to the distal end of the sheath.

4,708,138

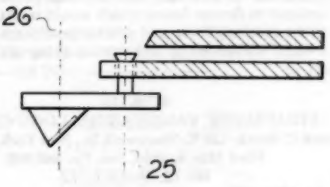
ROTATING SURGICAL CUTTING KNIFE

Bradford B. Pazandak, 5421 La Sierra, Dallas, Tex. 75231

Filed Oct. 27, 1983, Ser. No. 545,967

Int. Cl.[4] A61B *17/32*

U.S. Cl. 128—305 **10 Claims**



1. A hand held surgical instrument for use in performing an anterior capsulotomy procedure incident a cataract extraction comprising

an elongated handle having a proximal end to be grasped by the user during the procedure and a distal end, and

a blade-plate assembly rotatably mounted to the handle distal end for rotation about an axis substantially perpendicular to said handle, said assembly including a blade having a cutting edge and a sharp point, the rotatable mounting location of said assembly being offset displaced from the geometric center of said assembly so that when

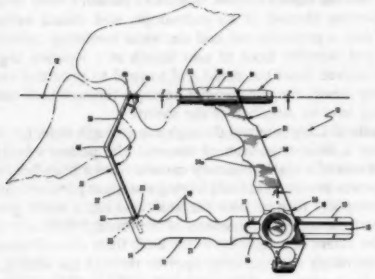
the instrument distal end is inserted in the eye anterior chamber to engage the anterior capsule with the blade cutting edge and the handle manipulated linearly in the plane of the anterior capsule to move the said distal end thereof in a continuous circular course about the anterior capsule periphery, the blade cutting edge is caused to follow said distal end movement with preferential rotation of said assembly that aligns the cutting edge in the direction of handle distal end movement to correspondingly incise the anterior capsule in a circular cutting course.

4,708,139

ARTHROSCOPIC DRILL GUIDE

William H. Dunbar, IV, 536 E. Arrellaga St., Santa Barbara, Calif. 93103

Filed Feb. 24, 1986, Ser. No. 832,402
Int. Cl.[4] A61F *17/32*
U.S. Cl. 128—305.1 **12 Claims**



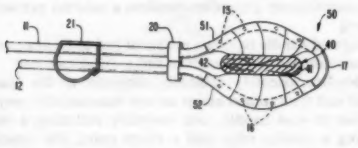
1. An improved arthroscopic drill guide comprising:
(a) a frame member;
(b) a probe connected to one end of said frame member and including a first section adjacent said frame member, a second section connected to said first section, and a probe tip at an end of said second section remote from said first section, said probe tip extending along a longitudinal axis;
(c) a slide member slidably connected to the other end of said frame member, said slide member including a guide at an end thereof remote from said frame member; and
(d) a cannula slidably mounted to said guide, said cannula including a guide bore therethrough extending substantially along said longitudinal axis;
(e) said probe member first section and second section having, substantially throughout their respective extents, cross sections elongated in a direction substantially perpendicular to said axis whereby said probe member is resistant to flexure forces which would tend to move said probe tip away from said axis to thereby maintain alignment of said probe tip and cannula along said axis.

4,708,140

ATRAUMATIC VASCULAR BALLOON CLAMP

Howard C. Baron, 222 E. Nineteenth St., New York, N.Y. 10003

Filed May 8, 1986, Ser. No. 860,995
Int. Cl.[4] A61B *17/12*
U.S. Cl. 128—325 **13 Claims**



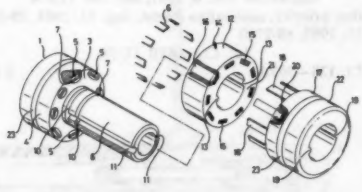
1. A temporary, non-implantable, disposable clamp for temporarily occluding the lumen of a blood vessel during surgery, comprising:
(a) a flexible hollow catheter adapted to be connected to a fluid source;
(b) a pair of spaced inflatable balloons, each of the balloons being positioned along and sealed to the exterior of a portion of the catheter and having a length on the order of the vessel diameter, the balloons being in fluid communication with the interior of the catheter and separated by a predetermined distance along the catheter on the order of twice the vessel wall thickness; and
(c) means for securing the catheter in a closed loop around the vessel, with the balloons presenting substantially parallel, opposed and spaced occluding surfaces on substantially opposite sides of the vessel with lateral expansion spaces for the vessel tissue adjacent the ends of the balloons, whereby inflation of the balloons clamps the vessel therebetween to close the lumen, the vessel wall expanding laterally into the expansion spaces as it is compressed.

4,708,141

SOLUBLE SUTURING DEVICE FOR AN INTESTINE

Noboru Inoue, and Yoshio Miura, both of Tokyo, Japan, assignors to Takasago Medical Industry Co., Ltd., Tokyo, Japan

Filed Mar. 24, 1986, Ser. No. 843,257
Claims priority, application Japan, Apr. 4, 1985, 60-50087[U]
Int. Cl.[4] A61B *17/04, 17/08*
U.S. Cl. 128—334 R **22 Claims**



9. A soluble suturing device for an intestine, comprising means for receiving and deforming the ends of a plurality of staples, means for temporarily holding a plurality of staples adapted to be inserted and engaged into said receiving and deforming means, means for pressing said staples out of said holding means into said receiving and deforming means, wherein said receiving and deforming means, said staple holding means, and said staple pressing means each is formed of a material soluble in an intestinal juice.

22. A method for suturing first and second severed portions of an intestine, comprising the steps of:
(a) inserting a front end of a suturing receptor having a guide cylinder into said first severed portion of said intestine such that a portion of said guide cylinder is protruding externally from said first severed portion of said intestine;
(b) covering said portion of said guide cylinder with a staple receiver and a suturing presser, said suturing presser comprising a plurality of staple-urging plates located at front end thereof, said staple receiver comprising a plurality of staple holding apertures, each of said staple holding apertures corresponding to a respective staple urging plate of said suturing presser;
(c) inserting said second severed portion of said intestine onto said suturing presser and said staple receiver;
(d) stretching mucous membranes of said first and second severed portions of said intestine;
(e) pressing a rear end of said suturing presser toward said suturing receptor thereby inserting said staple-urging plates into said staple holding apertures of said staple receiver;
(f) pushing staples located in said staple holding apertures

into said staple receptor thereby suturing said intestine; and

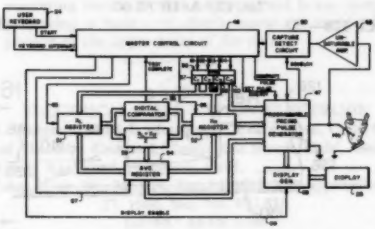
(g) dissolving said suturing receptor, said staple receiver and said suturing presser in an intestinal juice after a predetermined interval.

4,708,142

AUTOMATIC CARDIAC CAPTURE THRESHOLD DETERMINATION SYSTEM AND METHOD

Robert DeCote, Jr., Miami Beach, Fla., assignor to Cordis Corporation, Miami, Fla.

Filed May 28, 1985, Ser. No. 738,609
Int. Cl.[4] A61N 1/36
U.S. Cl. 128—419 PT **11 Claims**



1. A capture threshold determination system for automatically determining the capture threshold energy level of applied pacing pulses required to reliably stimulate cardiac events in a patient heart, comprising:

pulse generating means responsive to an applied energy level control signal for developing pacing pulses over a predetermined range of energy levels for application to the heart during successive reoccurring intervals;

capture detection means for connection to the heart for detecting cardiac events stimulated during each successive itnerval in response to the pacing pulses generated during that interval, and providing a capture detection signal indicative thereof;

first register means for storing a lower limit pulse energy level and providing an output indicative thereof;

second register means for storing an upper limit pulse energy level and providing an output indicative thereof;

computing means coupled to and responsive to the outputs of said first and second register means for computing the average of said pulse energy levels stored in said first and second register means and providing an output indicative thereof;

pulse amplitude control means coupled to and responsive during an initial one of said intervals to the output of one of said register means, and during subsequent intervals coupled to and responsive to the output of said computing means for producing an energy level control signal for application to said pulse generating means to cause said generating means to produce pacing pulses at the energy level of said one register during said initial interval, and at the average energy levels computed by said computing means during subsequent intervals;

transfer means responsive to said capture detection signal upon completion of each interval for transferring the then existing average pulse energy level indicated by the output of said computing means to said first register means in the event of non-capture during that interval, and to said second register means in the event of capture during that interval, whereby the energy level of said pacing pulses as determined by said energy level control signal approaches the capture threshold level with successive intervals; and

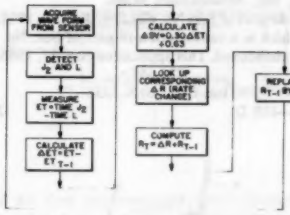
output circuit means coupled to and responsive to the outputs of said register means for providing an output control signal upon the difference between said outputs falling below a predetermined threshold level to indicate generation of pacing pulses at the capture threshold level.

4,708,143

METHOD FOR CONTROLLING PACING OF A HEART IN RESPONSE TO CHANGES IN STROKE VOLUME

Edward A. Schroeppel, Miramar, Fla., assignor to Cordis Leads Inc., Miami, Fla.

Division of Ser. No. 632,625, Jul. 19, 1984, Pat. No. 4,600,017.
This application Jul. 14, 1986, Ser. No. 885,063
Int. Cl.[4] A61N 1/30
U.S. Cl. 128—419 PG **2 Claims**



1. A method for sensing opening and closing of a tricuspid valve in a heart, for using those sensings to determine stroke volume, and for controlling pacing of a heart relative to changes in stroke volume, utilizing a pacing lead having a lead body and a pressure sensor mounted in the lead body, said method comprising the steps of:

sensing the opening of the tricuspid valve during each heart cycle;

sensing the closing of the tricuspid valve during each heart cycle;

determining ejection time from the openings and closing of the tricuspid valve;

calculating the change in ejection time, ΔET, from determinations of ejection time;

calculating changes in stroke volume, ΔSv_s;

determining the required change in heart rate, ΔR, relative to the change in stroke volume, ΔSv; and

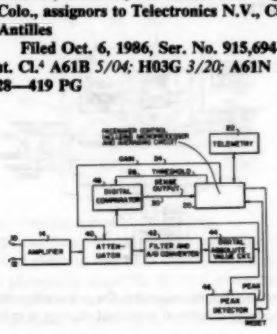
adjusting the pacing rate of a pacer relative to the required change in heart rate, ΔR.

4,708,144

AUTOMATIC SENSITIVITY CONTROL FOR A PACEMAKER

John R. Hamilton, Littleton, and Robert H. Whigham, Aurora, both of Colo., assignors to Telectronics N.V., Curacao, Netherlands Antilles

Filed Oct. 6, 1986, Ser. No. 915,694
Int. Cl.[4] A61B 5/04; H03G 3/20; A61N 1/36
U.S. Cl. 128—419 PG **10 Claims**



1. An automatic sensitivity control for an implantable pacemaker comprising means for sensing a cardiac signal, means for amplifying said cardiac signal, means for comparing the ampli-

fied cardiac signal with a threshold value for determining the occurrence of a cardiac event, means for measuring the peak amplitude of said amplified cardiac signal for the determined cardiac event, means for deriving a value representative of the average of the measured peak amplitudes during a preceding time interval which is at least a few minutes long, and means for varying the gain of said amplifying means in accordance with said derived value.

4,708,145

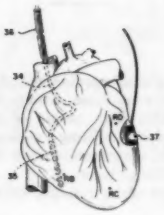
SEQUENTIAL-PULSE, MULTIPLE PATHWAY DEFIBRILLATION METHOD

Willis A. Tacker, Jr.; Joe D. Bourland; Charles F. Babbs, and Leslie A. Geddes, all of West Lafayette, Ind., assignors to Medtronic, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 624,269, Jun. 25, 1984, Pat. No. 4,548,203, which is a continuation-in-part of Ser. No. 383,781, Jun. 1, 1982, abandoned. This application Sep. 11, 1985, Ser. No. 774,667

Int. Cl.[4] A61N *1/36*

U.S. Cl. 128—419 D **20 Claims**



1. A method for controlling ventricular fibrillation or tachycardia comprising the steps of locating a first electrode adjacent the right ventricle, locating a second electrode adjacent at least one of the superior vena cava and inferior vena cava, locating a third electrode at the chest wall and sequentially pairing and pulsing two of said electrodes with the remaining electrode.

4,708,146

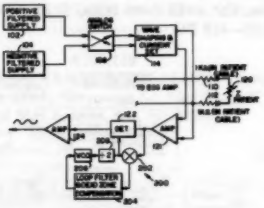
APPARATUS AND METHOD FOR IMPEDANCE PNEUMOGRAPHY

Philip S. Lane, Redmond, Wash., assignor to SpaceLabs, Inc., Bothell, Wash.

Filed Aug. 6, 1986, Ser. No. 893,834

Int. Cl.[4] A61B *5/08*

U.S. Cl. 128—723 **11 Claims**



1. An apparatus for monitoring the expansion and contraction of the thoracic cavity of a patient during respiration comprising:

means for generating and coupling to the patient a current carrier signal to be passed through the thorax of the patient;

means coupled to said carrier generating means for synchronously detecting an amplitude modulated voltage signal developed across the patient in response to the current carrier signal and the patient's varying thoracic impedance due to respiration; and

means for generating a reference signal for said synchronous detecting means which is in phase with the amplitude modulated voltage signal.

4,708,147

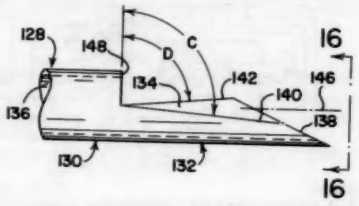
UNIVERSAL BIOPSY NEEDLE

John R. Haaga, 3409 N. Hilltop, Chagrin Falls, Ohio 44022

Continuation of Ser. No. 705,051, Feb. 25, 1985, abandoned, which is a continuation-in-part of Ser. No. 625,356, Jun. 27, 1984, abandoned. This application Dec. 19, 1986, Ser. No. 945,226

Int. Cl.[4] A61B *10/00*

U.S. Cl. 128—753 **21 Claims**



1. A single cannula biopsy needle adapted for both end cutting and side cutting of a tissue specimen from a tissue mass, said biopsy needle comprising:

a hollow thin wall cylindrical cannula of open ended configuration and having a center passage and a longitudinal axis, a distal end on said cannula forming a circumferentially opening and axially open ended continuous channel, said channel being defined by a frontal tip section and an intermediate cutting section, said frontal tip section having a frontal cutting edge lying in a plane forming a first acute angle with said longitudinal axis, said intermediate cutting section having first and second longitudinal cutting edges proximally contiguous with and forming proximal angled extensions of the said frontal cutting edge of said frontal tip section, said first and second longitudinal cutting edges being inclined with respect to said axis at a second acute angle lesser than said first acute angle, said frontal cutting edge of said frontal tip section being effective to axially incise a short length of tissue upon forward movement of the cannula along said longitudinal axis into a tissue mass and said first and second longitudinal cutting edges being effective to circumferentially sever the said incised tissue length from said tissue mass upon rotation of said cannula about said longitudinal axis.

4,708,148

MEASUREMENT OF SPINE EXTENSION

Gary M. Olson, Ashville, N.Y., assignor to Ganebac, Inc., Ashville, N.Y.

Filed Oct. 7, 1985, Ser. No. 784,749

Int. Cl.[4] A61B *5/10*

U.S. Cl. 128—781 **17 Claims**

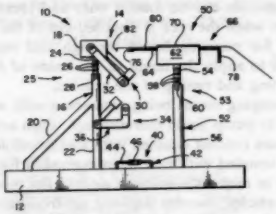
1. An apparatus for measuring end range extension of a lumbar spine of a standing patient comprising:

a brace means for immovably bracing the sacroiliac of the patient against backward movement, said brace means terminating adjacent the sacroiliac such that extension of the lumber spine is allowed;

a hips holding means for holding the hips of the patient in contact with said brace means;

a foot holding means located adjacent said brace means for

holding the feet of the patient against upward movment and directly below the hips; and



a measuring means located adjacent said brace means for measuring a backward displacement of an identifiable portion of the upper body of the patient.

4,708,149

ELECTRICAL STIMULATION ELECTRODE

Jens Axelgaard, 1104-B Victoria St., Costa Mesa, Calif. 92627, and Theodore Grussing, Huntington Beach, Calif., assignors to Jens Axelgaard, Fallbrook, Calif.

Division of Ser. No. 745,018, Jun. 14, 1985. This application Jan. 27, 1986, Ser. No. 822,816

Int. Cl.[4] A61N *1/04*

U.S. Cl. 128—798 **6 Claims**

1. A flexible transcutaneous electrical nerve and/or muscle stimulation electrode produced by a method comprising the steps of:

knitting a conductive fiber to form a conductive fabric having a rhombus shaped pattern of twisted conductive fibers with an open knit of conductive fibers therebetween for supporting a conductive adhesive in interstitial areas therein;

disposing a flexible conductive adhesive within said interstitial areas and on one side of the conductive fabric;

interconnecting an electrical lead wire with said conductive fabric; and

disposing a non-conductive sheet on an opposite side of said conductive fabric.

4,708,150

CIGARETTE FILTER

Charles G. Lamb, and Andrew McMurtrie, both of Louisville, Ky., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Aug. 25, 1986, Ser. No. 899,590

Int. Cl.[4] A24D *3/04*

U.S. Cl. 131—336 **4 Claims**

1. A filter for a cigarette comprising:

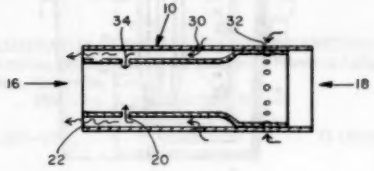
a porous filter rod of generally cylindrical configuration;

an air impermeable wrapper extending longitudinally along said filter rod from one end thereof to the other end and circumscribing said rod leaving flow-through opposed end of said filter rod;

said wrapper being formed with a plurality of grooves embedded into said filter rod, each of said grooves being open at the mouth end of said filter rod and extending therefrom in a generally longitudinal direction of said filter rod for a distance less than the length of said filter rod;

tipping material extending longitudinally of and circumscribing the wrapped filter rod;

first flow-through perforations formed through the tipping material, said first perforations being open to and in communication with said grooves providing for air flow into said grooves, said first perforations being sized for air flow therethrough and into the grooves at a first preselected pressure drop;



second air flow perforations formed through the tipping material and wrapper in a preselected area outside said grooves providing for air flow into the body of said porous filter rod, said second perforations being sized for air flow therethrough at a second preselected pressure drop greater than said first preselected pressure drop; and,

third air flow perforations formed through the wrapper in each of said grooves providing for air flow from the grooves into the body of said porous filter rod, said third perforations being sized for air flow therethrough at a third preselected pressure drop greater than said second preselected pressure drop.

4,708,151

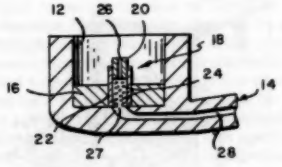
PIPE WITH REPLACEABLE CARTRIDGE

Gary R. Shelar, Greensboro, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Mar. 14, 1986, Ser. No. 840,114

Int. Cl.[4] A24D *1/18;* **A24F** *3/00, 5/00*

U.S. Cl. 131—359 **5 Claims**



1. A pipe having a bowl comprising:

(a) a replaceable cartridge, which cartridge comprises:

(i) a fuel element less than about 30 mm in length; and

(ii) a physically separate aerosol generating means in a conductive heat exchange relationship with the fuel element, the aerosol generating means including at least one aerosol forming material; and

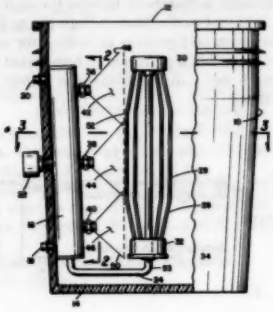
(b) means for retaining the cartridge in the bowl of the pipe, the retaining means being adapted to permit removal and replacement of the cartridge.

4,708,152

PAINT ROLLER CLEANER APPARATUS

Carl G. Hibberd, 1613 S. Cincinnati, Tulsa, Okla. 74119

Filed Aug. 26, 1986, Ser. No. 900,491
Int. Cl.[4] B08B 3/02
U.S. Cl. 134—138 4 Claims



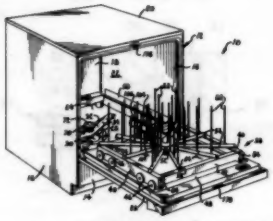
1. A cleaning apparatus for a paint roller which comprises:
an open top container having a closed bottom and capable of holding a liquid;
an elongated paint roller holder for supporting a paint roller within said container;
a water manifold attached to the wall of said container;
a plurality of jet fan nozzles attached to said manifold, each said jet fan nozzle having a notch therein and the notches being substantially aligned, each said notch being of a character to have an output fan type discharge directed essentially tangentially toward said paint roller periphery when mounted on said paint roller holder;
support rod supporting said elongated paint roller holder only from said manifold above the bottom of said container, said rod being rotatable with respect to said manifold to adjust the position of the jet fan nozzles with respect to said paint roller holder.

4,708,153

FLASK WASHER WITH VACUUM DRY

Larry G. Hambleton, Olathe, Kans.; Claude L. Sears, Liberty, and Elmer B. Offutt, Independence, both of Mo., assignors to Labconco Corporation, Kansas City, Mo.

Filed Dec. 5, 1985, Ser. No. 804,788
Int. Cl.[4] B08B 9/08
U.S. Cl. 134—170 12 Claims



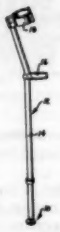
1. Apparatus for cleaning laboratory glassware articles, said apparatus comprising:
a shousing presenting a substantially enclosed compartment therein for washing and drying of the articles;
a glassware rack movable into and out of said compartment;
a manifold on said rack;
a liquid conduit coupled with said manifold at a liquid entry port to deliver liquid to said manifold;
a plurality of upstanding tubes on said rack in fluid communication with said manifold, each tube having an open top end and being adapted to receive a glassware article thereon with the article inverted and the open top end of the tube located within the interior of the article, whereby the articles can be loaded onto and removed from said tubes when the rack is disposed out of the compartment;
means for pumping liquid through said manifold to said tubes to apply the liquid to the inside of each article for washing and rinsing of the articles,
said pumping means being connected with said liquid conduit to pump liquid therethrough when active;
a vacuum conduit coupled with said manifold;
means coupled with said vacuum conduit for applying vacuum to each tube to draw air into the tubes from within the articles, thereby drawing air from the compartment into the articles and circulating the air therein to dry the insides of the articles; and
valve means for blocking said liquid port when said vacuum applying means is active and for blocking application of vacuum from said vacuum conduits to said manifold when said pumping means is active.

4,708,154

NONSLIP CRUTCH FOOT ASSEMBLY

Robert J. Edwards, 6916 W. 65th Ter., Overland Park, Kans. 66202

Filed Dec. 5, 1985, Ser. No. 804,853
Int. Cl.[4] A45B 9/04, 7/00
U.S. Cl. 135—84 3 Claims

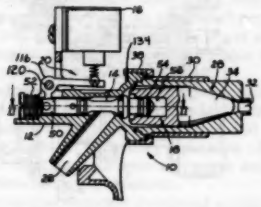


1. A nonslip foot assembly for a crutch having a tubular lower end, said foot assembly comprising:
a deformable sleeve closely fitted in said lower end of the crutch, said sleeve being laterally expansible in the lower end of the crutch to become anchored therein when the sleeve is axially compressed;
first and second threaded nuts above and below said sleeve;
a threaded bolt extending through said sleeve and threaded through said first and second nuts, said bolt being rotatable to move the nuts toward one another, thereby axially compressing said sleeve to effect lateral expansion thereof for anchoring the sleeve in the lower end of the crutch;
a foot having a nonslip surface thereon comprising a plurality of flexible and resilient fingers projecting from the foot for gripping against an underlying surface to which said fingers are applied; and
means for mounting said foot on said bolt in a manner permitting the foot to pivot about a pivot axis oriented substantially perpendicular to the lower end of the cruct,
wherein said foot includes a rigid disk pivotally connected with said bolt and a resilient pad bonded to said disk, said fingers projecting from said pad.

4,708,155
BEVERAGE DISPENSING VALVE WITH EASY OPENING

Forrest L. Austin, and Duncan T. Lasley, both of Hennepin Cty., Minn., assignors to The Cornelius Company, Anoka, Minn.

Filed Sep. 3, 1985, Ser. No. 771,747
Int. Cl.[4] F16K *31/10*
U.S. Cl. 137—1 24 Claims



1. A pre-mix carbonated beverage dispensing valve, comprising

(a) a valve body having an inlet, an outlet, a valve seat, and in which is mounted a normally closed reciprocable popet valve and means for selectively opening said poppet valve;

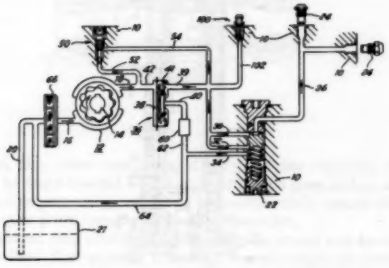
(b) balancing means on an upstream end of said poppet valve for balancing the pressure of the premix carbonated beverage against the poppet valve, and for lessening the force required to open the poppet valve to less than the force required to otherwise open the poppet valve in the absence of said balancing means; and

(c) a carbonated beverage flow rate control compensator fluidly in said inlet and positioned upstream of said poppet valve, said compensator having a downstream end which faces said poppet valve and is operatively connected to said balancing means.

4,708,156
FUEL BURNER PUMP ASSEMBLY

Hans J. Knudsen, Sonderborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Filed Mar. 20, 1987, Ser. No. 28,558
Int. Cl.[4] G05D *7/01*
U.S. Cl. 137—117 5 Claims

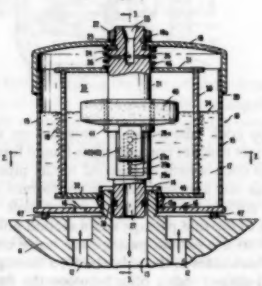


1. A one pipe oil burner system, comprising, pump means having an inlet and an outlet, tank means at a lower level than said pump means, supply pipe means between said tank means and said pump inlet, a regulating valve having inlet and outlet ports with nozzle means connected to said outlet port, a pressure operable diaphragm valve having inlet and outlet ports and a control port, throttling means between said pumping means outlet and said inlet ports of said diaphragm valve and said regulator valve, a check valve having an outlet port and an inlet port connected to said diaphragm valve outlet port, a return line connecting said outlet port of said check valve and said regulator valve to said pump means inlet, said check valve having a casing section forming an interior space, a rod section in said space having a longitudinal bore closed at one end thereof and having fluid communication with said check valve inlet at the other end thereof, said rod section having a transverse bore intersecting said longitudinal bore and having at least one open end, and a sleeve member made of a resilient and relatively soft material mounted on said rod section in surrounding relation to said transverse bore, said sleeve member being yieldable to allow air and oil to flow from said inlet to said outlet of said check valve upon a predetermined pressure occurring at said check valve inlet.

4,708,157
AIR ELIMINATOR FOR FLUID HANDLING SYSTEMS

Daniel Sabatino, Burlington, Conn., assignor to Flowtron Industries, Inc., Terryville, Conn.

Filed Oct. 7, 1986, Ser. No. 916,145
Int. Cl.[4] B01D *19/00*
U.S. Cl. 137—179 13 Claims



1. An air eliminator for liquid handling systems comprising a vertically oriented container having a liquid inlet and a liquid outlet disposed in spaced relation to one another in a bottom end wall of said container, vertically oriented porous barrier means within said container subdividing the interior of said container into first and second separate chambers that are disposed in side-by-side relation to one another, the lower end of said first chamber being in direct communication with said liquid inlet, the lower end of said second chamber being in communication with said liquid outlet via a modulating valve that is located in said second chamber, said vertically oriented barrier means comprising a sheet of porous material whose pores are sized to permit the flow of liquid in a generally horizontal direction from said first chamber to said second chamber through said porous material while preventing the passage therethrough of any air which is entrained in incoming liquid supplied via said liquid inlet to said first chamber, an air vent adjacent the top end wall of said container for keeping the air pressure within said container at atmospheric pressure, incoming liquid supplied to said liquid inlet entering said first chamber below existing liquid in said first chamber and accumulating in a first body of liquid in said first chamber which seeps in said generally horizontal direction through said porous material to form a second body of liquid in said second chamber, entrained air in the incoming liquid accumulating on the surface of said porous material facing said first chamber and bubbling vertically upwardly through said first body of liquid in a direction parallel to said sheet of porous material to the surface of the first body of liquid in said first chamber and into an air space in said first chamber which is located above the surface of said first body of liquid and which is maintained at atmospheric pressure by said air vent whereafter entrained air that has been separated from said first body of liquid escapes

from said container through said air vent, said modulating valve being responsive to the level of liquid in said second chamber and being operable to achieve a balance of flow between the liquid entering the lower end of said first chamber through said liquid inlet and the liquid leaving the lower end of said second chamber through said liquid outlet.

4,708,158

BALL-TYPE STOP COCKS HAVING STANDARD MATCHING FLANGES

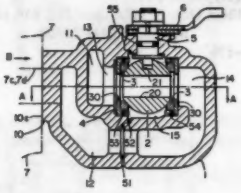
Osamu Akamatsu, Kobe, Japan, assignor to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Feb. 9, 1987, Ser. No. 12,530

Claims priority, application Japan, Apr. 21, 1986, 61-60396[U]

Int. Cl.[4] F16K *43/00, 5/06*

U.S. Cl. 137—315 **6 Claims**



1. A stop cock adapted to be mounted on an existing standard pipe seat bracket comprising, a flange formed on one side of the stop cock which is fastened to the pipe seat bracket, a first passage and a second passage are formed in the middle of the plane surface of the flange, a first hole which is to be connected to the first passage and a second hole which is to be connected to the second passage are made on the respective front and back sides of the valve body, a through hole is drilled into a ball-shaped valve plug between the first hole and the second hole, the ball-shaped valve plug is situated between the first hole and the second hole to open or close fluid communication therebetween, the valve plug is supported on seat members disposed on the respective sides thereof, a valve plug stem is inserted in and locked to the valve plug, a rotatable handle is fixed to the outer end of the stem, the first and second holes and said through hole forms a communication path which is arranged to align perpendicular to the flange face, one of the first and second holes is situated in the flange side while the other hole is situated on the opposite side of the body from the flange, the second passage which is formed in the bottom-side of the valve body opposite the flange is interconnected through a lower passageway formed in the valve body opposite the handle, said passages and said holes are arranged in the above manner so that an existing stop cock with a cone shape valve plug can be replaced by the present invented stop cock with a ball-shaped valve plug without any modifications to the standard pipe seat bracket.

4,708,159

PULSE COMBUSTION ENERGY SYSTEM

Hanford N. Lockwood, Jr., San Mateo, Calif., assignor to NEA Technologies, Inc., San Francisco, Calif.

Filed Apr. 16, 1986, Ser. No. 852,854

Int. Cl.[4] F16K *49/00*

U.S. Cl. 137—340 **18 Claims**

1. A valve comprising:

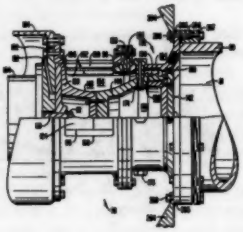
an outer sleeve having a radially oriented aperture;

a rotatable intermediate sleeve disposed coaxially within the outer sleeve and having a radially oriented aperture being generally aligned with the outer sleeve aperture when the intermediate sleeve is in a prescribed rotational position;

means, coupled to the intermediate sleeve, for rotating the intermediate sleeve within the outer sleeve;

an inner sleeve disposed coaxially within the intermediate sleeve, defining a chamber with an upstream end and a downstream end, and having a radially oriented aperture being generally aligned with the outer sleeve aperture;

means for sealing the upstream end of the inner sleeve so that a fluid medium exiting the chamber flows through the downstream end thereof; and



unidirectional flow means having an inlet end in fluid communication with the downstream end of the chamber and an outlet end for the discharge of the fluid from the unidirectional flow means, the unidirectional flow means including means for impeding a flow from the outlet end toward the inlet end to a substantially greater extent than a flow from the inlet end toward the outlet end.

4,708,160

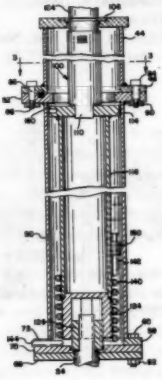
POST ASSEMBLY FOR BURIED VALVE HAVING AN ABOVE GROUND ACTUATOR

Steve M. Sharp, Naperville; John R. Holstrom; Lorand H. Gain, Jr., both of Montgomery, and John V. Ballun, Plainfield, all of Ill., assignors to Amsted Industries Incorporated, Chicago, Ill.

Filed Aug. 25, 1986, Ser. No. 899,721

Int. Cl.[4] F16L *5/00*

U.S. Cl. 137—368 **10 Claims**



1. An improved post assembly for a buried valve wherein the valve is rotatable by a valve shaft within a valve housing between open and closed positions, said post assembly comprising:

a support column to extend from said valve housing to an above grade indicator and valve actuator, said support column having a lower column section connectable to said valve housing and extending to a peripheral flange at a first level at about grade surface and an upper column

section abutting said flange and extending toward said indicator and valve actuator;

first breakaway means normally holding said upper column section on said flange, said first breakaway means being disengageable from at least one of said upper column sections and flange upon a sufficient impact force being applied laterally of said upper column sections;

a connecting shaft extending axially through said support column said connecting shaft having upper and lower shaft portions substantially coextensive with said upper and lower column sections the upper shaft portion extending into said valve actuator and the lower shaft portion terminating in a socket member engageable with an odd shaped nut secured to said valve shaft;

second breakaway means normally holding said lower and upper connecting shaft portions together at about said first level whereby to transmit torque from said actuator to said valve shaft yet permitting separation of said upper and lower shaft portions upon said upper and lower column sections becoming separated;

a torsion spring concentrically positioned around the bottom of said lower shaft portion and socket member with one end of said spring held between said lower column sections and said valve housing and the other end of said torsion spring being held in place against the lower shaft portion whereby to bias the lower shaft portion to turn said valve to one of said open and closed positions

and alignable holes on said lower shaft portion and through said lower column section adjacent said peripheral flange, said holes socket member and odd shaped nut being arranged so that said holes are in alignment only when said valve is in said one position.

4,708,161

PLUG VALVE

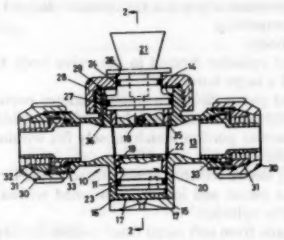
Malcolm W. Phillipps, Stirling, Australia, assignor to Philmac Pty Limited, Plympton, Australia

Filed Oct. 1, 1986, Ser. No. 913,981

Claims priority, application Australia, Oct. 3, 1985, PH2738

Int. Cl.[4] F16L *7/00*; F16K *25/00*

U.S. Cl. 137—375 **7 Claims**



1. A plug valve comprising a body and cap assembly, the body having a tapered wall therein defining a plug socket, and respective port surfaces defining circumferentially spaced inlet and outlet ports opening into said plug socket,

a tapered plug contained within the plug socket and having a fluid flow passage extending therethrough, an elastomeric sleeve surrounding portion of the plug,

said cap being a retaining cap releasably engaging the body and retaining the plug within its plug socket, and

at least one 'O' ring seal between the plug and the body and cap assembly,

said body comprising a parallel wall extending from the outer end of said tapered wall, said plug comprising a circumferential groove containing an 'O' ring seal which sealably and slidably engages said parallel wall,

said body further comprising a bleed aperture extending from said inlet port to a space between the plug and cap, such that fluid pressure, when at the inlet port, urges the plug into said socket.

4,708,162

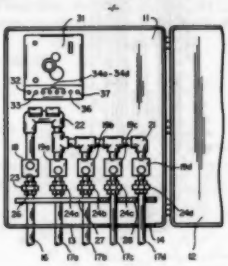
SPRINKLER CONTROL SYSTEM

John J. Bayat, 3501 Cashill Blvd., Reno, Nev. 89509

Filed Apr. 8, 1986, Ser. No. 849,470

Int. Cl.[4] A01G *27/00*

U.S. Cl. 137—382 **2 Claims**



1. In a system for controlling the flow of water from a supply line to a plurality of outlet lines: a generally rectangular cabinet having a hingedly mounted front cover movable between open and closed positions, a horizontally extending rack mounted in the cabinet and having a plurality of vertically extending openings through which supply and outlet lines extend, pipe unions of greater lateral extent than the openings in the rack mounted on the outlet lines above the rack and serving to retain the outlet lines in the rack, a manifold positioned above the unions, an electrically actuated master valve connected to the supply line, a pipe union connected to the master valve permitting disconnection of the system from the supply line, an anti-siphon valve connected between the master valve and the manifold, electrically actuated control valves connected between the manifold and the unions on the outlet lines, and a clock timer mounted in the cabinet and connected to the master valve and the control valves for actuating said valves.

4,708,163

SAFETY VALVE

Thomas M. Deaton, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Jan. 28, 1987, Ser. No. 7,749

Int. Cl.[4] E21B *33/00*

U.S. Cl. 137—460 **28 Claims**

1. A safety valve for installation within a well flow conductor comprising:

a. a housing means with a longitudinal flow passageway extending therethrough;

b. a valve closure means having a first position allowing fluid flow through the longitudinal flow passageway and a second position blocking fluid flow through the longitudinal flow passageway;

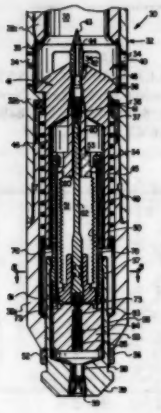
c. means for biasing the valve closure means to its first position;

d. bellows means partially defining a variable volume chamber means within the housing means;

e. means for communicating fluid pressure between the variable volume chamber means and fluid pressure flowing through the longitudinal flow passageway;

f. means for latching the valve closure means in its first position;

g. the bellows means including means for releasing the latching means; and



h. means for shifting the valve closure means from its first position to its second position after the latching means has been released.

4,708,164

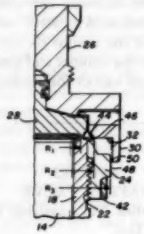
SAFETY RELIEF VALVE

David J. Scallan, Pineville, La., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jun. 16, 1986, Ser. No. 874,921

Int. Cl.[4] F16K *17/20*

U.S. Cl. 137—476 **1 Claim**



1. An improved safety relief valve including a hollow valve body having a fluid inlet, a fluid outlet, a valve seat encircling said inlet, a valve member movable toward and away from said seat defining a cracking area when in engagement with said seat, adjustable means biasing said valve member into sealing engagement with said seat until the fluid pressure in said inlet exceeds a predetermined value, and a valve member carrier having a downwardly projecting peripheral flange having a lower end and providing a cylindrical interior, the improvement comprising orifice forming means on said valve seat, said orifice forming means including:

an annular member moveably located on said seat;

a cylindrical outer peripheral surface on said annular member sized to fit closely and concentrically within the cylindrical interior of the flange of said valve member carrier and always disposed within the lower end of said flange when said valve member is in engagement with said seat forming a substantially constant area, variable length orifice therewith when said valve member is in engagement with or relatively close to said seat defining a lift area that is substantially larger than said cracking area;

a radiused end surface on said outer peripheral surface forming a variable area orifice with the end of said flange when said valve member is located remote from said seat, whereby a large volume flow area change occurs upon slight movement of said valve member relative to said orifice forming means;

an axially projecting annular portion smaller in diameter than said outer peripheral surface extending toward said valve member and forming a second orifice with said valve carrier member defining a closing area of a size between said cracking area and said lift area; and,

a locking member extending into said valve body and engaging said annular member for permitting and preventing rotation of said annular member on said seat.

4,708,165

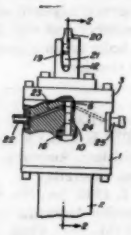
HIGH PRESSURE STEPPED CLEARANCE SEAL VALVE IN A CRYOGENIC REFRIGERATION SYSTEM

Philip A. Lessard, Acton, and Marshall J. Smith, Danvers, both of Mass., assignors to Helix Technology Corporation, Waltham, Mass.

Filed Apr. 29, 1986, Ser. No. 857,722

Int. Cl.[4] F25B *9/00*; F16K *31/12*

U.S. Cl. 137—509 **13 Claims**



1. A high pressure cryogenic refrigerator stepped clearance seal valve, comprising:

a. a valve body;

b. a stepped cylinder formed in the valve body by a small bore and a large bore;

c. a stepped piston having a small diameter portion which closely fits within the small bore of the cylinder and a large diameter portion which loosely fits within the large bore of the cylinder;

d. a floating sleeve which is closely fitted to the large diameter of the piston and loosely positioned within the large bore of the cylinder;

e. a wire made from soft metal fitted within the large bore of the cylinder to form a seal between the sleeve and the wall of the cylinder and to portion the sleeve within the cylinder such that it is aligned with that large diameter portion of the piston concentrically.

4,708,166

CONTROL VALVE FOR AUTOMATICALLY MAINTAINING A CONSTANT FLUID FLOW RATE

Klaus Kobold, Sodener Strasse 120, 6230 Kelkheim, Fed. Rep. of Germany

Filed Jul. 31, 1986, Ser. No. 890,949

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1986, 8604762[U]

Int. Cl.[4] G05D *7/01*

U.S. Cl. 137—512.1 **18 Claims**

1. A control valve for automatically maintaining a constant rate of flow of a fluid through a pipeline, said control valve comprising:

a housing having therethrough a passage including an inlet opening and an outlet opening smaller than said inlet opening;

an orifice plate positioned within said passage adjacent said outlet opening, said orifice plate having therethrough an orifice; and

a regulating diaphragm positioned within said passage at a location upstream of said orifice plate, said regulating diaphragm having therethrough circumferential ports and a central opening smaller than said orifice, said regulating diaphragm being formed of an elastic material such that

said regulating diaphragm is deflectable toward said orifice plate in response to pressure differences across said control valve between a maximum deflected position, whereat said regulating diaphragm abuts said orifice plate, thereby closing said circumferential ports, and fluid flow is restricted by said central opening, and positions whereat said regulating diaphragm is spaced from said orifice plate, thereby allowing fluid flow through said circumferential ports, said regulating diaphragm comprising at least two elongated elastic metal laminae arranged crosswise with respect to each other and connected in the area of crossing.

4,708,167

CHECK VALVE

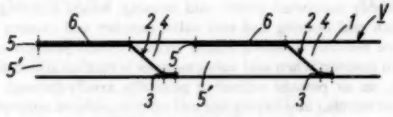
Toshimichi Koyanagi, 1-11-3, Taiheiji, Kashihara-shi, Osaka-fu, Japan

Filed Dec. 1, 1986, Ser. No. 936,304

Claims priority, application Japan, Dec. 4, 1985, 60-187389[U]

Int. Cl.[4] F16K *15/16*

U.S. Cl. 137—512.15 **10 Claims**



1. A check valve comprising a fluid pipe of a plastic film formed in a flat shape, and at least one valve body of a rectangular plastic film disposed in said fluid pipe,

said valve body being bonded at the longitudinal edges thereof to the longitudinal edges of said fluid pipe,

the tip end of said valve body in the fluid flowing direction being bonded to the inner side of one of the upper and lower flat surfaces of said fluid pipe to form a closed portion and an open portion,

the base end of said valve body being not bonded to said fluid pipe to form openings between said valve body and the flat upper and lower surfaces of said fluid pipe,

whereby a fluid can flow in a gap between one of said openings at the base end of said valve body and said open portion at the tip end thereof.

4,708,168

VALVED BODY FOR HERMETIC MOTOR-COMPRESSORS FOR REFRIGERANT FLUIDS

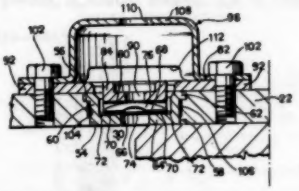
Federigo Peruzzi, Turin, Italy, assignor to Aspera S.r.l., Turin, Italy

Filed Oct. 9, 1986, Ser. No. 917,128

Claims priority, application Italy, Oct. 10, 1985, 67857 A/85

Int. Cl.[4] F16K *15/02*

U.S. Cl. 137—543.19 **17 Claims**



1. Valved body for motor compressors for refrigerant fluids of the type constituted by a metal casting which includes a wall adjoining a compression chamber for the fluid and has a fluid discharge port controlled by an automatic discharge valve, wherein the wall comprises essentially:

an aperture defining a seat,

a cup shaped inset of sintered steel housed in the seat and having a cavity therein defined by a peripheral skirt and an end wall located on the side nearer the compression chamber with a central aperture constituting the discharge port and with an annular sealing rib surrounding the opening of the port within the cup shaped insert,

a cover applied and fixed to the cup-shaped inset on the outer face of the wall and having outlet openings for the fluid from the cavity of the insert,

a disc obturator housed and guided within the insert so as to leave a passage for the fluid between the periphery of the obturator itself and the peripheral skirt of the insert, and cooperating with the sealing rib, and

a disc spring interposed between the obturator and the cover for thrusting the obturator against the annular rib wherein the disc spring is a diametrally arcuate washer, having an extradotal surface the middle of which bears against the disc obturator and the peripheral edge of which bears against the cover at the two ends of the arc, and wherein the cover has a ring of outlet apertures located in correspondence with the periphery of the cavity of the cup-shaped insert and a central outlet aperture coincident with the central aperture of the arcuate washer.

4,708,169

PNEUMATIC PRESSURE GAUGE

Jackson Liu, No. 167-40, Chien Kuo Road, Sec. 2, Min Hsiung Hsiang, Chia I, Hsien, Taiwan

Filed Nov. 13, 1986, Ser. No. 930,579

Int. Cl.[4] F16K *37/00*

U.S. Cl. 137—557 **3 Claims**

1. A pneumatic pressure gauge comprising:

(a) a gauge casing comprising first and second cylindrical portions threadedly coupled at first ends thereof;

(b) first support means rigidly connected to a second end of said first cylindrical portion, said first support means having a passageway therethrough which is in communication with a bore of said first cylindrical portion;

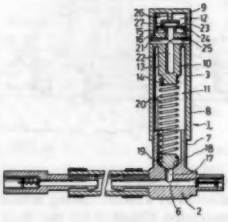
(c) second support means connected to a second end of said

second cylindrical portion, said second support means having a first passageway therethrough which is in communication with a bore of said second cylindrical portion;

(d) a pressure responsive valve means having a first position whereat said valve means abuts said first support means whereby said passageway in said first support means is closed, and a second position whereat said valve means does not abut said first support means, whereby said passageway in said first support means is open, said valve means being displaced from its first position to its second position in response to a predetermined pressure in said passageway in said first support means.

(e) a pressure responsive diaphragm means made of elastic material and having a peripheral portion secured sealingly to said second support means,

wherein said second support means comprises a substantially annular base portion, a first tubular portion rigidly connected to said base portion and having a bore, a second tubular portion



rigidly connected to said base portion and having a bore, said first tubular portion being arranged in said bore of said second tubular portion, and a second passageway which is in communication with said bore of said first tubular portion and a space external to said second cylindrical portion, said diaphragm means being secured to an end of said second tubular portion and having a first position whereat said diaphragm means abuts an end of said first tubular portion, whereby said end of said first tubular portion is closed, said first and second tubular portions, said base portion and said diaphragm means defining an annular contol chamber when said diaphragm means is in its first position, said control chamber being in communication with said first passageway of said second support means, whereby said diaphragm is displaced from its first position to a second position in response to said predetermined pressure in said passageway of said first support means, control chamber and said bore of said first tubular portion being in communication when said diaphragm means is in its second position.

4,708,170

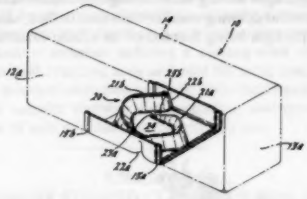
MOTOR VEHICLE FUEL TANK WITH UNITARY FUEL RESERVOIR

Wallace O. Bailey, Northville, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 727,700, Apr. 26, 1985, Pat. No. 4,638,836.
This application Oct. 10, 1986, Ser. No. 917,874
Int. Cl.[4] B65D *1/24*; B29C *49/00*
U.S. Cl. 137—574 **2 Claims**

1. A method of forming a motor vehicle fuel tank having a unitary tank wall comprising a bottom wall and opposed side walls extending upwardly from said bottom wall, said fuel tank comprising a fuel reservoir unitary with said tank wall and comprising two opposed subtantially C-shaped ridges extending upwardly into said tank from the plane of said bottom wall, each said ridge being of certain height at a first end unitary with a corresponding one of said side walls and each said ridge fairing into said corresponding one of said side walls and extending toward the opposed side wall to a second end, said ridge from a point remote from said second end diminishing in height substantially continuously to approximately the plane of said bottom wall, said ridges cooperating to partially surround a portion of the surface area of said bottom wall, a channel between the second end of each said ridge and the other said ridge extending substantially in the plane of said bottom wall to permit fuel to flow to said partially surrounded surface area from the remaining portion of the surface area of said bottom wall, said method comprising:

(A) forming a parison of molten thermoplastic material;



(B) blow molding said parison while molten within a molding chamber, the molding surface of said molding chamber corresponding to the exterior contour of said fuel tank and providing reservoir wall-forming ridges corresponding to said C-shaped ridges of said fuel reservoir; and

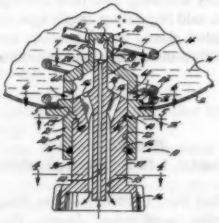
(C) removing said fuel tank from said molding chamber after cooling of said thermoplastic material.

4,708,171

DRAIN VALVE

Roger L. Cudaback, Gibbon, Nebr., assignor to J. A. Baldwin Manufacturing Co., Kearney, Nebr.

Filed Nov. 14, 1986, Ser. No. 930,430
Int. Cl.[4] F16K *24/00*
U.S. Cl. 137—588 **11 Claims**



1. A selectively operable valve for enabling liquid to be drained from a sealed vessel, said valve comprising a stationary housing adapted to be secured to said vessel, a valve member rotatably supported within said housing, means coacting between said housing and said valve member and causing said valve member to move axially from a closed position to an open position when said valve member is rotated in one direction, an air passage extending generally axially through said valve member and having one end open to ambient atmosphere at all times in both positions of said valve member, a liquid passage extending generally axially through said valve member and isolated from said air passage, means within said housing for sealing said air and liquid passages with respect to said vessel when said valve member is in said closed position, means in said housing for establishing communication between said vessel and said air passage and between said vessel and said liquid passage when said valve member is in said open position whereby air is permitted to enter said vessel and liquid is permitted to drain from said vessel, and a sealing ring telescoped into said housing and over said valve member and remaining in

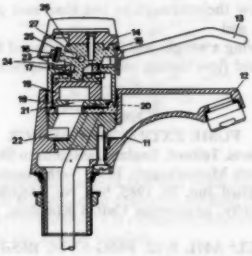
said housing at all times when said valve member is moved between said closed and open positions.

4,708,172

DEVICE AT MIXING VALVES

Voldemar Riis, Vårgårda, Sweden, assignor to Vargarda Armatur AB, Vårgårda, Sweden

Filed Sep. 23, 1986, Ser. No. 911,665
Claims priority, application Sweden, Sep. 25, 1985, 8504429
Int. Cl.[4] F16K *11/078, 51/00*
U.S. Cl. 137—625.17 1 Claim



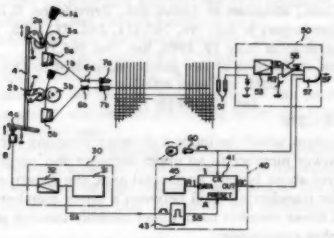
1. A device in a mixing valve for liquids, for example hot and cold water, and of the kind that comprises a valve housing which is provided with an outlet and an inlet for each of the liquids, an operation member for regulating the amount and temperature of the liquid flowing out through the outlet, the operating member being a double-armed lever rotatble about a vertical as well as a horizontal axle, the lever having a longer arm which includes a handle extending outside the housing and a shorter arm which includes an actuator arranged inside the housing and cooperating with a valve member, said actuator being provided with a stop part co-operating with a stop face for limiting the maximum outflow of liquid, characterized in that said stop part includes a resilient tongue which when tightened against the stop face is arranged to spring and permit an increase of the outflow, the spring movement of the tongue being limited by a stop member, and the stop part and the stop member being integrated with the actuator and separated by means of a slit.

4,708,173

METHOD AND APPARATUS FOR CONTROLLING WEFT DETECTION ON A FLUID JET LOOM

Toshio Yoshida, Kanazawa, Japan, assignor to Tsudakoma Kogyo Kabushiki Kaisha, Japan

Filed Jun. 18, 1986, Ser. No. 875,488
Claims priority, application Japan, Jun. 18, 1985, 60-133507
Int. Cl.[4] D03D *51/34*
U.S. Cl. 139—370.2 5 Claims



1. Method for controlling weft detection on a fluid jet loom equipped with a free weft exchanger in which success in weft insertion is detected in response to every feeler period signal and a loom stop signal is issued when faulty weft insertion is detected, comprising the steps of

issuing a weft selection signal upon every weft exchange, and

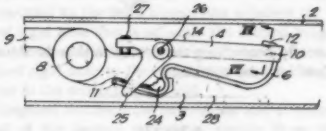
allowing issue of said loom stop signal only after a predetermined number of feeler periods from issue of said weft selection signal.

4,708,174

WEFT GRIPPER FOR WEAVING MACHINE

Michel M. J. Vandeweghe, Heuvelland; Johnny-Fredy-Maurice Victoor, Langemark, and Remi-Louis Lagache, Voormezele-Ieper, all of Belgium, assignors to N.V. Weefautomaten Picanol, Belgium

Filed Apr. 8, 1986, Ser. No. 849,445
Claims priority, application Belgium, Apr. 9, 1985, 2/60661
Int. Cl.[4] D03D *47/20*
U.S. Cl. 139—448 13 Claims



1. A weft gripper for a weft gripper weaving machine comprising

a gripper body;

a weft clamp mounted on the gripper body and including a pair of components, one of which is movable relative to the gripper body and the other of which is fixed relative to the gripper body; said movable component being movable towards and away from the fixed component; said components defining a pair of contact areas between which a weft thread may be clamped;

spring biasing means for normally urging the components towards each other;

a resilient element attached to a first one of said components and defining at least in part one of said contact areas;

said resilient element being pretensioned to resist movement of the movable component toward the other component as the respective contact areas approach and engage each other;

adjustabale pretension control means carried by the gripper for varyingi said pretensions of said resilient element; said resilient element comprising an elongate spring element bowed to product said pretension;

said adjustable pretension control means comprising means for varying the degree of bowing of said resilient element.

4,708,175

METHOD AND APPARATUS FOR AUTOMATED FILLING OF A CONTAINER WITH A FLUID

Robert J. Janashak, Rochester Hills; Christopher G. Felice, Troy, and Hadi A. Akeel, Sterling Heights, all of Mich., assignors to GMF Robotics Corporation, Auburn Hills, Mich.

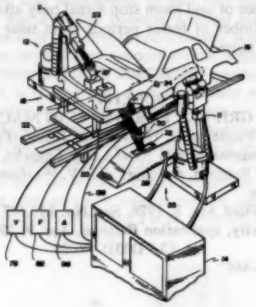
Filed Aug. 25, 1986, Ser. No. 899,829
Int. Cl.[4] B65B *3/04*
U.S. Cl. 141—1 22 Claims

1. A method for the automated filling of a container fixedly mounted on a vehicle to move therewith at a work station, the method utilizing a robot system which includes at least one robot having an arm provided with a device movable relative to at least three control axes for putting fluid into the container, the method comprising the steps of:

moving the vehicle into the work station;

locating the vehicle at the work station so that the container is positioned at an expected container location;

automatically moving the device through a predetermined motion relative to the three control axes to the expected container location so that the device mates with the container; and



automatically controlling the device so that the device puts the fluid into the container.

4,708,176

RISER FOR DRAWING OFF LIQUIDS

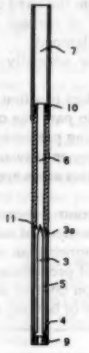
Gerhard Esser, Am Herzleiterbach 8, D-5330 Königswinter 41, Fed. Rep. of Germany

Filed Dec. 7, 1984, Ser. No. 679,403

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1983, 3344182

Int. Cl.[4] G05D *7/01*

U.S. Cl. 141—65 **8 Claims**



1. A vertical riser for substantially foam-free drawing of a liquid containing a gas, which tends to cause foaming at atmospheric pressure when subjected to a velocity greater than a predetermined velocity from a pressurized receptacle; the riser comprising:

a vertically elongated lower entry chamber for receiving the gas-containing liquid from the receptacle;

a vertically elongated reduction chamber of constant cross-section extending upward from the entry chamber;

an elongated reduction pin contained substantially within said entry chamber at low receptacle pressures which produce liquid flow velocities through the chambers less than the predetermined velocity, and movable from said entry chamber to substantially within said reduction chamber at high receptacle pressure which can produce, in the absence of said pin, a liquid flow velocity through the chambers equal to or greater than the predetermined velocity;

said entry chamber having a horizontal cross-section larger than the cross-section of said reduction chamber for forming with said pin, when in a lowered position, a first annular passage having a cross-section sufficiently large to permit flow of liquid through the chambers at said predetermined velocity during said high receptacle pressures;

said reduction chamber and said reduction pin having horizontal cross-sections and lengths for forming, when said reduction pin is positioned within said reduction chamber, a second annular passage having a constant cross-section extending for a length designed to restrict the velocity of liquid flow therethrough to less than said predetermined velocity; and

said pin having a weight less than the upward forces thereon from liquid flow during said high receptacle pressures.

4,708,177

FUME EXTRACTOR DEVICE

David L. Roberts, Telford, England, assignor to Shell Internationale Research Maatschappij, B.V., Netherlands

Filed Jun. 20, 1985, Ser. No. 746,686

Claims priority, application United Kingdom, Jul. 12, 1984, 8417780

Int. Cl.[4] A47L *9/02*; B65G *67/06*; B65B *1/28*

U.S. Cl. 141—93 **3 Claims**

1. A fume extractor device for attachment adjacent a filling orifice of a drum-shaped container, which device comprises an annular hollow collar having inner and outer walls connected to one another, an outlet in the outer wall which is connectable to a fume removal system, and at least one opening in the inner wall, a resilient seal to engage with the container around the filing orifice, and means for releasably clamping the hollow collar and resilient seal to the drum-shaped container with the inner wall disposed around the filling orifice, whereby in the operation of the device, the drum-shaped container may be filled or emptied by means of a dip tube inserted into the container through the hollow collar and the filling orifice and vapors escaping from the container through the orifice are extracted through the at least one opening in the inner wall and out of the hollow collar through the outlet by the fume removal system.

4,708,178

FLUID COUPLING SYSTEM

Jack Pollack, Reseda, and Richard F. Pabers, Canoga Park, both of Calif., assignors to Amtel, Inc., Providence, R.I.

Continuation-in-part of Ser. No. 747,411, Jun. 21, 1985. This application May 19, 1986, Ser. No. 864,798

The portion of the term of this patent subsequent to Oct. 13, 2004, has been disclaimed.

Int. Cl.[4] B65B *3/04*

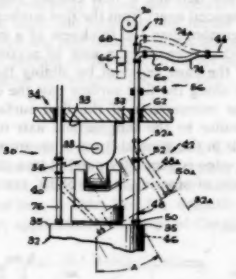
U.S. Cl. 141—279 **9 Claims**

1. In a system which includes a pivoting coupling for connecting a lower member to an upper member and permitting them to pivot about largely horizontal axes, the improvement of means for transferring fluid between a lower member conduit at said lower member to an upper member conduit at said upper member comprising:

a flexible middle conduit having upper and lower end portions and extending in a largely vertical direction and spaced from at least one of said horizontal axes, said upper

end portion lying closest to said upper member and said lower end portion lying closest to said lower member;

means for coupling said upper and lower end portions of said flexible middle conduit respectively to said upper and lower member conduits;



means for supporting one of said end portions of said middle conduit in movement in primarily vertical directions with respect to the member it is closest to, whereby to minimize flexing of the middle conduit.

4,708,179

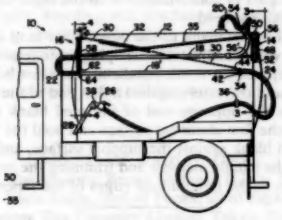
EXTENDIBLE HOSE ASSEMBLY FOR SERVICE TRUCK

William G. Beaty, P.O. Box 781, Manchester, Tenn. 37355

Continuation-in-part of Ser. No. 818,874, Jan. 14, 1986, abandoned. This application Apr. 22, 1987, Ser. No. 41,118

Int. Cl.[4] B67D *5/36*

U.S. Cl. 141—388 **2 Claims**



1. A portable extendible hose and support assembly mountable on and connectable to a tank located on a service vehicle, comprising in combination:

a relative short rigid hose,

a first hinge comprising a generally U-shaped bracket defined by legs attached to the tank, and a first tubular member having a first axial center supported between the legs of the U-shaped bracket, with a bolt extending vertically through said legs and the axial center of the tubular member, and having a vertical axis,

means attaching the tubular member to the short rigid hose,

a second hinge comprising a vertically disposed second pin and a second tubular member, with the pin extending through the second axial center of the second tubular member, said second pin having upper and lower ends and a vertical axis,

a third hinge comprising a horizontally disposed pin having ends and attached to the lower end of the second pin, with two rotatable lugs rotatably attached to the ends of said horizontal pin, said horizontal pin defining a horizontal axis,

a combination of serially connected hoses defining hose portions,

said first hinge supporting said combination on the tank of the vehicle and allowing horizontal swingable movement of the combination of serially connected hoses about the vertical axis of the hinge,

said second hinge being horizontally spaced from and supported by said first hinge, and allowing horizontal swingable movement of a portion of said combination of serially connected hoses about the vertical axis of the second hinge,

said third hinge permitting vertical movement of said hose portion of the combination of hoses about the horizontal axis of the horizontal pin,

said combination of hoses comprising:

a first elongated rigid hose having ends and mounted on the first hinge, and connected in fluid communication with the short rigid hose, said elongated hose extending to the second hinge such that the ends of the first elongated hose are located adjacent the first and second hinges,

means connecting the end of the first elongated rigid hose adjacent the second hinge to the second hinge,

a second elongated rigid hose having ends, one of which is attached to the third hinge by the rotatable lugs, the end supported by the third hinge lying adjacent the end of the first rigid hose that is adjacent the second hinge,

a flexible hose serially connecting the end of the first elongated rigid hose to the end of the second elongated rigid hose at the second hinge, and

an elongated flexible hose having one end connected to the end of the second rigid hose remote from the second hinge, with the other end of the elongated flexible hose being free to be maneuvered as desired.

4,708,180

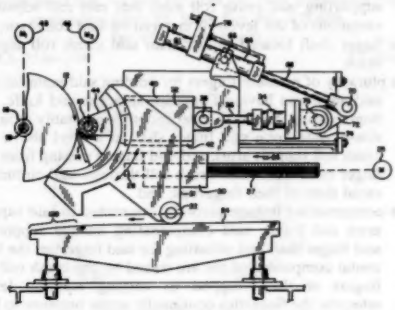
LARGE DIAMETER NOSE BAR ROLL APPARATUS FOR VENEER LATHE WITH AUTOMATIC KNIFE GAP ADJUSTMENT DURING PEELING

Robert A. Browning, Jr., Portland; Gary W. Ely, Canby, and Leonard L. Hayes, Tigard, all of Oreg., assignors to The Coe Manufacturing Company, Painesville, Ohio

Continuation-in-part of Ser. No. 638,309, Aug. 7, 1984, Pat. No. 4,602,663. This application May 23, 1986, Ser. No. 867,462

Int. Cl.[4] B27L *5/02*

U.S. Cl. 144—213 **20 Claims**



1. A veneer lathe apparatus, comprising:

drive means for rotating a log about a longitudinal axis of rotation;

knife means for cutting a sheet of wood veneer from said log with a knife blade while the log is being rotated;

feed means for advancing said knife blade toward the log as said log is peeled to reduce its diameter to a minimum diameter;

knife angle adjustment means for adjusting the pitch angle of said knife blade during peeling;

a nose bar roll means for applying pressure to the surface of the side of said log during peeling, said nose bar roll means

contacting the log on at least a major portion of its length at a contact position ahead of said knife blade;

gap adjustment means for reducing the knife gap between said nose bar roll means and said knife blade during peeling in response to decreases in the log diameter and changes in the knife pitch angle, and to maintain contact with the log at the proper pressure as the diameter of the log decreases; and

electrical control means for automatically controlling said gap adjustment means in response to decreases in the log diameter and changes in the knife pitch angle.

4,708,181

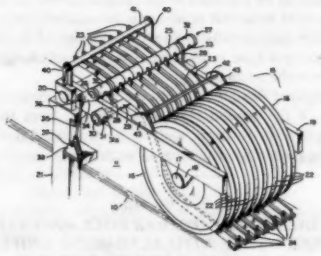
FEED WORKS FOR VENEER CHIPPERS

Irving L. Plough, Snohomish, Wash., assignor to Acrowood Corporation, Everett, Wash.

Filed May 23, 1986, Ser. No. 866,624

Int. Cl.[4] B27B *31/00*; B27L *11/00*

U.S. Cl. 144—249 R **9 Claims**



1. An apparatus for feeding resilient material being transported on a conveyor means across an anvil into contact with a knife, comprising:

a frame supporting said conveyor and apparatus;

a rotating crush roll for holding said material onto said conveyor as said material approaches said anvil, said roll being formed with a plurality of circumferential slots;

support arms swing-mounted on the frame and rotatably supporting said crush roll such that said roll adjusts to variations of the levels of material on said conveyor;

a finger shaft located higher than said crush roll support arms;

a plurality of pressure fingers for holding said material onto said anvil and having fingertips adjacent said knife, said fingers being generally independently pivotably mounted side-by-side upon said finger shaft at a level above said crush roll support arms, and said fingers passing from said finger shaft under said crush roll through said circumferential slots to their fingertips; and

a compensating linkage pivotally connected to said support arms and frame, said compensating linkage supporting said finger shaft and offsetting for said fingertips the horizontal component of the arc traced by the crush roll and fingers as they respond to varying material levels, whereby the fingertips continually apply pressure to hold said material onto said anvil adjacent said knife.

4,708,182

REEDMAKING SYSTEM, METHODOLOGY, AND COMPONENT TOOLS

Edward B. Laker, 2116 Cook Pl., Ramona, Calif. 92065

Filed Aug. 5, 1986, Ser. No. 893,344

Int. Cl.[4] B27L *5/02*; B27C *1/14*; B26B *13/00*

U.S. Cl. 144—369 **21 Claims**

1. A device for thickness sizing a cane segment of the type used in making a finished reed for a single reed instrument, comprising:

an elongated member adapted to be moved manually and placed upon a selected work surface;

a first longitudinally-extending surface on the elongated member on which to lay a selected cane segment;

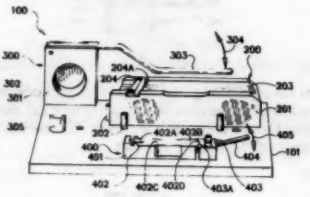
a blade member attached to the elongated member in spaced apart relation to the first surface; and

cutting means defining a first cutting edge on the blade member spaced apart from the first surface a first distance slightly greater than the thickness of a conventional finished reed, for enabling a user to accomplish thickness sizing of the cane segment by sliding the cane segment manually along the first surface past the cutting edge;

wherein the intersection of the first surface and a plane perpendicular to the longitudinal axis of the elongated member is in the general form of an arc of a circle; and

the cutting edge is generally parallel to a chord of the arc.

18. A method of tapering a reed blank, comprising:



using a tapered bar attached to a handle member having a first abutment surface against which to place the reed blank, the tapered bar defining a generally flat support surface extending generally perpendicular from the first abutment surface to a distal end of the tapered bar between a pair of generally straight, longitudinal edges spaced apart in conformance with the taper of a conventional finished reed;

securing the reed blank to the tapered bar atop the support surface with an adjustable clamping arrangement attached to the tapered bar at the distal end that bears both longitudinally and traversely against a first end of the reed blank to force the opposite end of the reed blank engagingly against the first abutment surface and hold the first end of the reed blank against the support surface; and

grasping the handle member and trimming the reed blank to conform to the longitudinal edges of the tapered bar.

4,708,183

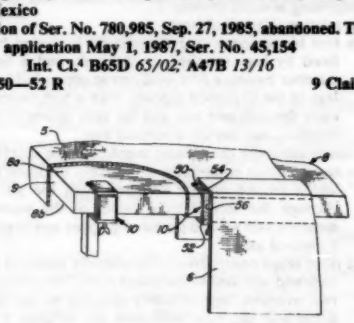
COMBINATION TABLE COVER AND SKIRT RETAINER

Jose L. Figueroa, Hilario Malpica #10, Costa Azul, Acapulco Gro., Mexico

Continuation of Ser. No. 780,985, Sep. 27, 1985, abandoned. This application May 1, 1987, Ser. No. 45,154

Int. Cl.[4] B65D *65/02*; A47B *13/16*

U.S. Cl. 150—52 R **9 Claims**



9. A retainer to secure a table cover adjacent the edge of a table top comprising: a resilient retainer member; a web portion and first and second legs on said retainer means, said retainer member and said first and second legs being integrally

formed of extruded polycarbonate; friction means on the first of said legs to grippingly engage a table cover; a resilient cushion on an unsupported end of said first leg, said cushion being positioned to prevent marring of a table top by said first leg; a pressure foot operatively connected to said second leg; means movably securing said pressure foot relative to said second leg; means resiliently urging said pressure foot toward said first leg; and hook and loop fastener means on said web portion and said first leg, said fastener means being connectable to a separate skirt portion of the table cover for supporting the skirt portion adjacent the edge of the table top.

4,708,184

TIRE PRESSURE REGULATING UNIT

Franz Pechar, Neu-Ulm, Fed. Rep. of Germany, assignor to Iveco Magirus AG, Ulm, Fed. Rep. of Germany

Filed Sep. 7, 1984, Ser. No. 648,633

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1983, 3332677

Int. Cl.⁴ B60C *23/00*

U.S. Cl. 152—417 **5 Claims**

1. In a tire pressure regulating unit for modifying the air pressure in vehicle tires while traveling and rotatable with a wheel on which the tire is mounted said wheel having an outer side; the unit includes a source of compressed air which is connected to the tires via supply lines in which are included rotors, control valves, shutters disposed and connected operatively in line between the latter and the tires, and at least one adjustable regulator valve having a modulated relay valve; the improvement in combination therewith comprising:

a rapid release valve, which includes a valve element in the form of a resilient diaphragm and which is connected in line intermediate a control valve and the rotor said control valve intermediate said rapid release valve and said tire and an orifice which is operatively connected in parallel with the rapid release valve which permits a continuously atmospheric bleeding and discharge of air from the tire directly to the outer side of the wheel when the adjusted regulating pressure at the regulator valve, is lower than present tire pressure to permit an exact assimilation of the tire pressure with the regulating pressure.

4,708,185

PNEUMATIC RADIAL TIRE

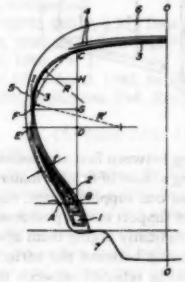
Isamu Imai, Tokorozawa; Kazuo Oshima, Tokyo; Kenichi Tanaka, and Norio Inada, both of Fuchu, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Continuation of Ser. No. 594,631, Mar. 29, 1984, abandoned. This application Oct. 9, 1986, Ser. No. 917,285

Claims priority, application Japan, Mar. 30, 1983, 58-52556

Int. Cl.⁴ B60C *3/00, 9/02*

U.S. Cl. 152—451 **3 Claims**



1. In a pneumatic radial tire comprising a toroidal tire body extending from bead portions to a crown portion through sidewall portions, and a reinforcement for the tire body consisting of a carcass composed of at least one cord ply containing polyester fiber cords therein, which cord ply being wound around a bead core embedded in each of the bead portions from the inside of the tire to the outside thereof, and a belt composed of at least two ply layers superimposed around the crown portion of the carcass and containing cords arranged at a relatively small inclination angle with respect to the mid-circumferential plane of the tire, the cords of which being crossed with each other, the improvement wherein:

a carcass line of said tire body at a mounted state of the tire on a normal rim under a normal internal pressure depicts such a radial profile in tire section that a ratio of R/R' is within a range of 0.65–0.85 in which R' is a radius of a reference arc which passes an intersection B between the carcass line and a straight line passing through an alienating point of the outer surface of the bead portion from a flange of the rim and being in parallel with the rotational axis of the tire, an intersection C between the carcass line and a line segment being perpendicular to the above straight line and extending from the intersection B, and a point located from the line segment $\overline{BC}$ at an interval equal to a distance extending from the line segment $\overline{BC}$ to the maximum width of the carcass line when the line segment $\overline{BC}$ is taken as a chord, and R is a radius of curvature of a contour curve in a shoulder portion of the carcass line extending to the intersection C, and that a maximum distance f between the reference arc and a contour curve in a base portion of the carcass line smoothly connecting to the above contour curve and having a single inflection point toward the intersection B is within a range of 5–10 mm; and

said polyester fiber cord has an elongation ΔE under a tension of 2 g/d of not less than 5%, and a value of $\Delta S + 0.4\Delta E$ of not more than 5.0% in which ΔS is a heat shrinkage of the cords as measured at 177° C. for 30 minutes.

4,708,186

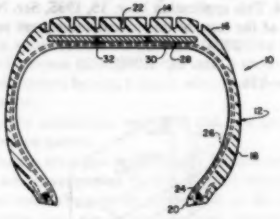
SEGMENTED-BAND BANDED TIRE

Michael A. Kopsco, Wantagh, and Edward G. Markow, Oakdale, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Continuation of Ser. No. 460,147, Jan. 24, 1983, abandoned. This application Mar. 11, 1986, Ser. No. 838,450

Int. Cl.⁴ B60C *17/00*

U.S. Cl. 152—516 **5 Claims**



1. A run-flat radial tire comprising:

a casing having a treaded crown portion and sidewalls terminating radially inwardly to generally circular beads adapted to normally seat themselves in airtight secured relationship with a wheel;

a plurality of resilient coaxially spaced band segment means embedded within the crown portion for resisting compressive load forces exerted thereon when the tire is deflated;

a plurality of radial means embedded within the casing for transmitting compressive load forces to the band means when the tire is deflated; and

elastomeric material located between individual segments of

the band means for transferring the compressive forces to all band means and ensuring a preselected ratio of tire bending stiffness in the circumferential direction compared with the lateral direction thereby improving tire performance when deflated.

4,708,187

TIRE MADE OF CASTABLE OR SPRAYABLE ELASTOMERS

Oskar Schmidt, Bruck an der Leitha, and Wladislaw Kubica, Hainburg/Donau, both of Austria, assignors to Lim Kunststoff Technologie Gesellschaft m.b.H., Kittsee, Austria

Filed Apr. 5, 1985, Ser. No. 720,095

Claims priority, application Austria, Apr. 6, 1984, 1181/84; Mar. 26, 1985, 897/85

Int. Cl.[4] B60C *9/00*; B32B *5/12*

U.S. Cl. 152—530 **6 Claims**

1. A tire comprising:

a pair of bead rings;

a tire-forming body of an elastomer selected from the group which consists of castable and sprayable elastomers and having a road-engaging portion, side walls extending from said road-engaging portion, and beads along inner edges of said side walls in which said bead rings are embedded;

a tire belt embedded in said body in said road-engaging portion;

a radial reinforcement in said body anchored to said bead rings; and

a spacer in addition to said belt and said radial reinforcement separating same from an inner wall of said body and embedded in said body, said belt lying in direct contact with said spacer, said spacer being solely constituted of a knitted fabric net flexible in all directions and lying immediately radially outwardly in said body from said inner wall while extending in said road-engaging portion and in each of said side walls adjoining said road-engaging portion, said spacer terminating radially outwardly of said beads, said elastomer penetrating into said knitted fabric net so that the net with elastomer penetrating therein holds said belt and said radial reinforcement spaced from interior surfaces of said tire.

4,708,188

CABLE LADDER SYSTEM AND IMPROVED V-CLOSURE BLINDS

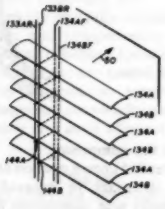
Mervin H. Bytheway, Jr., 9135 Golden Gate Ave., Orangevale, Calif. 95662

Continuation-in-part of Ser. No. 593,082, Mar. 26, 1984, Pat. No. 4,651,794. This application Mar. 15, 1985, Ser. No. 710,763

The portion of the term of this patent subsequent to Mar. 24, 2004, has been disclaimed.

Int. Cl.[4] E06B *9/26*

U.S. Cl. 160—174 **33 Claims**



1. A venetian blind having a head portion, at least one tilt rod , at least one drum on each end of the blind within said head portion , said at least one drum having a front cable mount slot and a rear cable mount slot and mounted for rotation by said at least one tilt rod and ,

a plurality of spaced slats, each of said slats having a front edge and a rear edge said slats being in a horizontal disposition when said slats are in a first or open position, and a cable ladder system mounted to said at least one drum, at least at opposite ends of of the width of said blind,

said cable ladder system comprising a pair of ladders designated the A ladder and the B ladder, which ladders each have a pair of spaced vertical side cables, one of which is the front cable and the other of which is the rear cable, said front and rear cables being mounted to said at least one drum in said cable mount slots,

said side cables being interconnected by spaced parallel rungs, the rungs connected to the side cables of each of the two ladders being spaced the spacing between two slats, one of the ladder's rungs being offset one slat space whereby the A ladder and the B ladder each support alternate slats between their side cables,

means operatively connected to said at least one tilt rod to rotate said at least one drum and move said A ladder and said B ladder, such that the front cable of each of the two ladders moves in opposite directions, upwardly or downwardly, and the rear cable of each of the two ladders moves in opposite directions, upwardly or downwardly, and the front cable and the rear cable of each of the A and B ladders move in opposite directions,

whereby when said at least one drum is rotated, all slats will move from the open position to a second or closed position in alternating movement, one upwardly and the next downwardly such that the front edge of any one slat moving in one direction, touches the front edge of the next adjacent slat moving in the opposite direction to effect a V-closure.

4,708,189

SCREEN

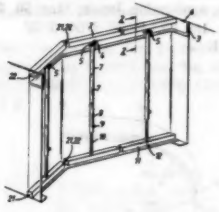
Alec D. Ward, 23 Saxton Road, Pakefield, Lowestoft, Suffolk, England

Filed Jan. 31, 1986, Ser. No. 824,423

Claims priority, application United Kingdom, Feb. 5, 1985, 8502821; Mar. 11, 1985, 8506205; Jun. 13, 1985, 8514963; Sep. 6, 1985, 8522206

Int. Cl.[4] A47G *5/00*

U.S. Cl. 160—351 **18 Claims**



1. A screen extending between first and second spaced apart surfaces and comprising a sheet of flexible material, at least one pair of rails and at least one support means, each pair of rails having at least one said support means positioned between the rails of each pair and resiliently urging them apart, the sheet of flexible material extending between the surfaces with a first portion of the sheet being retained between the first surface and one rail and a second portion of the sheet being retained between the second surface and the other rail of each pair of rails.

4,708,190

TREATING METALS AND/OR METALLIC COMPOUNDS

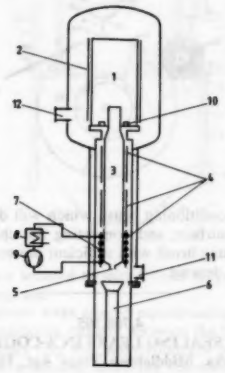
Robert Hack, Lahnau, and Helmut Strzala, Braunfels, both of Fed. Rep. of Germany, assignors to Arthur Pfeiffer Vakuumtechnik Wetzlar GmbH, Fed. Rep. of Germany

Filed Jul. 18, 1986, Ser. No. 887,992

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1985, 3525747

Int. Cl.⁴ B22D *1/00*

U.S. Cl. 164—76.1 **8 Claims**



7. A method of treating metals or metallic compounds in one apparatus, comprising the steps of distilling the metals or metal compounds, condensing the distillate in a condenser having an opening at the lower end thereof, solidifying the condensate to obtain a solidified condensate, such that initially the opening of the condenser is closed by the solidified condensate, melting the solidified condensate by applying heat by means of a multiple-stage heating unit, the stages of the multiple-stage heating unit being switched on successively from top toward bottom so that, after the solidified condensate closing the opening of the condenser has been melted, the entire melted condensate flows out of the condenser and is cast into a mold below the condenser.

4,708,191

APPARATUS FOR INDICATING THE LEVEL IN METALLURGICAL VESSELS BY ELECTROMAGNETIC MEANS

Franz-Rudolf Block, Roetgen; Wolfgang Theissen, Würselen; Urs Basler, and Branislav Pesovic, both of Steinhausen, all of Fed. Rep. of Germany, assignors to Stopinc Aktiengesellschaft, Baar, Switzerland

PCT No. PCT/EP85/00319, § 371 Date Feb. 24, 1986, § 102(e) Date Feb. 24, 1986, PCT Pub. No. WO86/00987, PCT Pub. Date Feb. 13, 1986

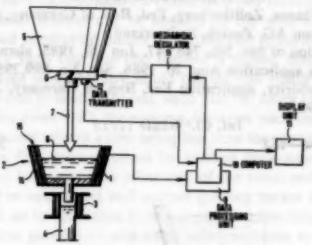
PCT Filed Jul. 3, 1985, Ser. No. 835,852

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1984, 3427563

Int. Cl.⁴ B22D *2/00, 11/18*

U.S. Cl. 164—150 **10 Claims**

1. An apparatus for measuring the filling level of a molten metal bath contained within a metallurgical vessel, including electromagnetic coils arranged in a vessel wall, wherein transmitting and receiving coils are aligned with respect to a preselected height of the molten metal bath, comprising at least one transmitting coil and at least two receiving coils which are staggered side by side relative to one another in a common plane in the casting direction, said receiver coils being surrounded by said transmitter coil and said coils forming a measuring unit that is insertable as a modular unit into a refractory lining of said vessel, the axes of said transmitting and receiving



coils being substantially parallel to the surface of said molten metal bath.

4,708,192

CASTING LINE MELT SUPPLY DEVICE

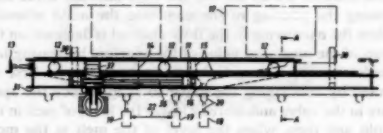
Einar Anttila, and Kare Folgerö , both of Västerås, Sweden, assignors to ASEA Aktiebolag, Västerås, Sweden

Filed May 21, 1986, Ser. No. 865,287

Claims priority, application Sweden, May 22, 1985, 8502507

Int. Cl.⁴ B22D *5/04, 37/00*

U.S. Cl. 164—323 **6 Claims**



1. Casting apparatus for simultaneously casting at least two casting mould means arranged to move in a casting line, each casting mould means having a sprue, wherein the casting apparatus comprises:

a furnace for containing molten metal and provided with two furnace spouts;

support means arranged beneath said furnace spouts;

carriage means supported by the support means and movably mounted thereon for movement in the direction of the casting line, the carriage means carrying two melt transfer devices for transferring molten metal from the two furnace spouts to respective sprues of two casting mould means in the casting line;

adjustment means for adjusting the longitudinal position of at least one of the melt transfer devices relative to the carriage means; and

moving means for moving the carriage means and the melt transfer device relative to the support means forwards along the casting line together with forwardly moving casting mould means during a casting operation and backwards along the casting line in readiness for another casting operation.

4,708,193

PROCESS FOR REMOVING DEPOSITS FROM THE FLOW CHANNEL OF A TUNDISH DURING CONTINUOUS CASTING

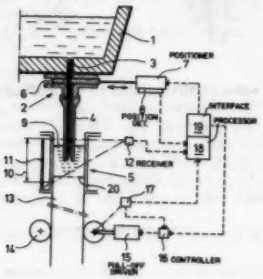
Bernhard Tinnes, Zollikerberg, Fed. Rep. of Germany, assignor to Metacon AG, Zurich, Switzerland

Continuation of Ser. No. 746,847, Jun. 20, 1985, abandoned. This application Aug. 20, 1986, Ser. No. 899,295

Claims priority, application Fed. Rep. of Germany, Jun. 20, 1984, 3422901

Int. Cl.[4] B22D *11/18*

U.S. Cl. 164—453 3 Claims



1. In a process for pouring a metallic melt from a metallurgical vessel into a continuous casting mold having a pull-off driver for pulling off the cast strand via a flow channel and a controlled valve having a variable aperture, comprising the steps of:

measuring the level of melt in the casting mold;

measuring the aperture of the controlled valve;

measuring the pull-off rate of the cast strand leaving the casting mold;

an improved process for removing obstructions from the flow channel which narrow the flow channel while continuing the pouring of the melt into the mold wherein, when the narrowing in the flow channel is detected on the basis of the measured value of the aperture increasing to a predetermined value, a throttling operation is first effected by controlling the valve so as to reduce the aperture in the valve and thereby lower the level of melt in the mold and then, when the level of the melt in the mold reaches a predetermined lower level, a widening the aperture of the valve to its maximum value is effected so as to cause a surge of metallic melt to flow through the flow channel and thereby remove the obstructions therefrom until such time that the level of the melt in the mold reaches a predetermined upper value and then the aperture of said valve is controlled so as to maintain the level of melt in the mold at the upper value.

4,708,194

METHOD AND APPARATUS FOR RAPIDLY SOLIDIFYING METAL EMPLOYING A METALLIC CONDITIONING BRUSH

Walter R. Mohn, Simpsonville, S.C., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Jul. 27, 1981, Ser. No. 287,338

Int. Cl.[4] B22D *11/06, 11/07*

U.S. Cl. 164—463 7 Claims

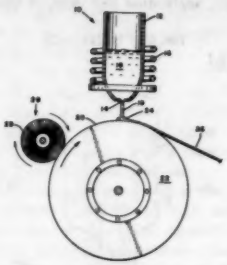
1. A rapid solidification ribbon casting system having a caster for deposition of liquid metal on a moving chill surface, the improvement comprising:

at least one conditioning brush which contacts the chill surface,

said conditioning brush comprising bristles of a metal that will deposit said chill surface; and

means for applying pressure to cause deposition of metal from said conditioning brush onto the casting surface.

6. An improved method for rapidly solidifying a metal on a moving chill surface said improvement comprising the steps of:



selecting a conditioning brush which will deposit metal on said chill surface; and contacting the chill surface with said conditing brush with sufficient pressure to establish a detectable deposit.

4,708,195

METHOD OF SEALING LEAKS IN A COOLING SYSTEM

Robert W. Barks, Middletown Trace Apt. F65, Middletown, Del. 19709

Filed Sep. 19, 1986, Ser. No. 909,270

Int. Cl.[4] C09K *3/12*

U.S. Cl. 165—1 1 Claim

1. The method of sealing leaks in the coolant system of internal combustion engines which comprises:

(a) operating the engine with the coolant at an elevated temperature,

(b) adding to the coolant a mixture comprising, sodium silicate in a range of 2.5% to 5% of the coolant, blue vitroil in a range of 0.004% to 0.008 % of the coolant and gum of arabic in a range of 0.001% to 0.003% of the coolant,

(c) continuing the operation of the engine until the leak is sealed,

(d) stopping the engine to reduce the temperature of the coolant to the ambient.

4,708,196

SHAFT COOLER FOR THE DRY QUENCHING OF COKE

Jurgen Tietze, Universitätsstrasse 83; Wilhelm Dangaillier, Friederikastrasse 88; Heinz Thubeaville, Ministerstrasse 18; Siegfried Pohl, Am Dornbusch 13, all of 4630 Bochum, and Friedrich Müller, Hauptstrasse 224, 4690 Herne 2, all of Fed. Rep. of Germany

PCT No. PCT/DE83/00128, § 371 Date Mar. 23, 1984, § 102(e) Date Mar. 23, 1984, PCT Pub. No. WO84/00557, PCT Pub. Date Feb. 16, 1984

PCT Filed Jul. 22, 1983, Ser. No. 604,653

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1982, 3228291; Mar. 18, 1983, 3309695

Int. Cl.[4] C10B *39/00*

U.S. Cl. 165—47 15 Claims

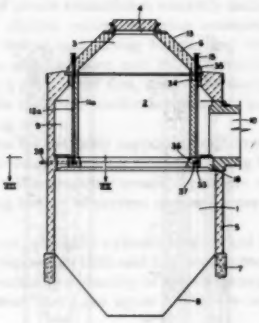
1. A shaft cooler for dry quenching of coke, said cooler including the combination of:

a vertical refractory chamber extending along a central vertical axis with a conical top portion having a central coke charging opening, a substantially cylindrical portion below said conical top portion and extending to a bottom coke discharge opening;

a masonry ring suspended by tubular stays against a bottom edge of said conical top portion to extend around a top

part of said cylindrical portion, said tubular stays attached at their upper ends to said top portion and extending parallel to said central vertical axis at an equidistant spacing from one another about the periphery of said ring;

manifolding means for providing coolant to said tubular stays;



retaining means secured to said tubular stays to retain said masonry ring; and

refractory support webs spaced equidistantly from one another and extending radially between the bottom portion of said masonry ring and said cylindrical portion to form flue passages extending upwardly therebetween for conducting flue-gas.

4,708,197

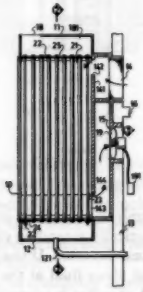
AIR TO AIR HEAT EXCHANGER

R. Ralph Robbins, 62 Thatcher Drive, Winnipeg, Manitoba, Canada R3T 2L3

Filed Nov. 1, 1985, Ser. No. 793,974

Int. Cl.⁴ F24H *3/02*; F24F *7/10*

U.S. Cl. 165—54 **7 Claims**



1. A heat exchanger for exchanging heat between fresh cold air and warm contaminated air comprising a housing, means defining a fresh air inlet and a fresh air outlet in the housing, means defining a contaminated air inlet and a contaminated air outlet in the housing, a heat exchange core, means mounting the core in the housing such that the contaminated air passes through the core in a first path from the contaminated air inlet to the contaminated air outlet and such that the fresh air passes through the core in a second path separate from and fluid impervious to the first path from the fresh air inlet to the fresh air outlet, the core comprising a plurality of impermeable cylindrical plastics tubes of circular cross section arranged in aligned parallel spaced relation, each having a wall formed by an impermeable plastics material which is sufficently thin and flexible that it is not self-supporting, means for supporting said tubes consisting solely of a pair of tube support sheets spaced longitudinally of the tubes and each having means gripping the wall of each tube adjacent a respective end thereof such that longitudinal tension can be applied to the wall by the tube sheet, said supporting means mounting said tubes substantially vertically such that one end thereof is higher than the other end thereof whereby any liquid therein can readily run from said one end to said other end, such that the tubes are arranged in aligned rows with the spacing between each tube and the next adjacent tube in a row being less than the spacing between the rows, first guiding means for guiding the contaminated air from said inlet into said other end of the tubes and from said one end to said outlet and second guiding means for guiding the fresh air to said tubes from a position at one side thereof in a direction parallel to said rows and transverse to said tubes such that the fresh air from said fresh air inlet first encounters said tubes adjacent said one end and flows past said tubes generally longitudinally thereof and in counterflow to said contaminated air and leaves said tubes adjacent said other end.

4,708,198

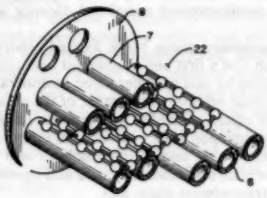
CONSTRUCTION AND METHOD FOR IMPROVING HEAT TRANSFER AND MECHANICAL LIFE OF TUBE-BUNDLE HEAT EXCHANGERS

Richard A. Holl, 1912 Four Seasons Dr., Burlington, Ontario, Canada L7P 2Y1

Continuation-in-part of Ser. No. 438,300, Nov. 1, 1982, abandoned. This application Mar. 29, 1985, Ser. No. 717,580

Int. Cl.⁴ F28F *13/12*

U.S. Cl. 165—109.1 **10 Claims**



1. In a heat exchanger of the type utilizing a plurality of essentially longitudinal tubes carrying a first flowing fluid, and surrounded by a second flowing fluid for heat exchange therebetween, the improvement comprising;

a longitudinal tube bundle having individual tube axis arranged in a predetermined pattern, said tubes having inner and outer surfaces;

a plurality of interstitial fluid flow volumes defined by said tube outer surfaces, said volumes having first and second cross-sectional areas, and inlet and outlet ends;

a flow interrupting matrix disposed in said interstitial flow volumes, said matrix comprising a rectangular grid-like configuration having flow interrupters and members interconnecting said interrupters disposed across said first and second areas respectively, thereby defining third and fourth flow areas for carrying interrupted flow in said flow volumes;

means admitting fluid into and out of said inlet and outlet ends respectively;

wherein interrupted fluid flow passing through said flow volumes enhances heat exchange between said first and second fluids.

4,708,199

HEAT EXCHANGER

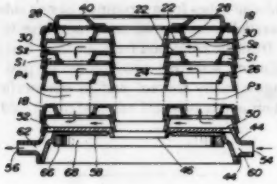
Takeji Yogo, Sakado; Akitsuna Nakagaki, Kowagoe; Akio Miyazawa, Kamifukuoka; Takeshi Mitomo, Kitamoto, and Takayuki Ichihara, Sayama, all of Japan, assignors to Kabushiki Kaisha Tsuchiya Seisakusho, Tokyo, Japan

Filed Feb. 28, 1986, Ser. No. 834,816

Claims priority, application Japan, Feb. 28, 1985, 60-28283[U]; Mar. 28, 1985, 60-64619; Jul. 30, 1985, 60-117012[U]; Aug. 31, 1985, 60-13354[U]; Jan. 31, 1986, 61-13377[U]

Int. Cl.[4] F28F *3/00*

U.S. Cl. 165—167 24 Claims



1. A heat exchanger for first and second fluids, comprising:

a plurality of substantially identical heat transmission plates disposed one upon another, each heat transmission plate including a flat section through which heat exchange is made between the first and second fluids, a plurality of annular flanges formed extending from said flat section, each annular flange defining a through-hole opened through said flat section, and means for defining a plurality of openings opened through said flat section, at least one of said through-holes and at least one of said openings being alternately located along a circle on said flat section of said heat transmission plate, axes of adjacent said through-hole and said opening being separate from each other by a predetermined peripheral distance along said circle;

said heat transmission plates being located relative to one another such that a first one of adjacent heat transmission plates is shifted by said predetermined peripheral distance along said circle relative to the other of the adjacent heat transmission plates, in which said annular flange of said first heat transmission plate contacts said other heat transmission plate so that said through-hole of said first heat transmission plate communicates with said opening of said other heat transmission plate; and

means for sealingly connecting said heat transmission plates to each other to define a first fluid flowing space for the first fluid and a second fluid flowing space for the second fluid on opposite sides of each of said first and other heat transmission plates.

4,708,200

APPARATUS FOR MAINTAINING CLEAN FLUID IN A CHAMBER IN A SUBTERRANEAN WELL TOOL

John V. Salerni, Kingwood, and Joseph F. Donovan, Spring, both of Tex., assignors to Baker Oil Tools, Inc., Orange, Calif.

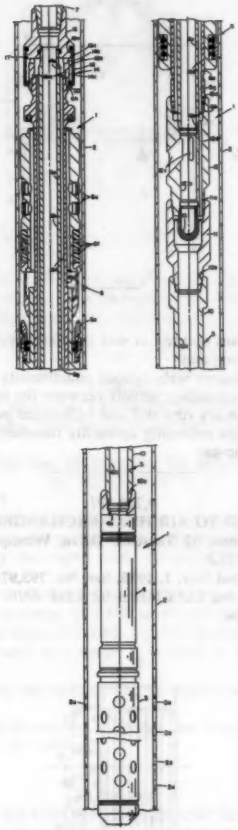
Continuation of Ser. No. 648,587, Sep. 10, 1984, Pat. No. 4,667,735. This application May 29, 1986, Ser. No. 868,653

The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.

Int. Cl.[4] E21B *43/117*

U.S. Cl. 166—55.1 5 Claims

1. A subterranean well tool suspendable in a well bore containing fluid on a well conduit defining an annulus between the exterior of the conduit and the well bore; said well tool defining a vertically extending internal chamber filled with a clean fluid having a specific gravity less than the well fluids contained in said annulus; means for subjecting said clean fluid to the fluid pressure of said annulus fluids comprising: annular conduit means communicating with the top portions of said vertically extending chamber and extending upwardly and defining an inverted U-shaped annular passage; said inverted U-shaped annular passage having a downwardly directed annular passage communicating with said annulus; and pressure transmitting sealing means fixedly secured in the lower end of said downwardly directed passage and operative in said



fixed position to transmit annulus fluid pressure to said clean fluid, whereby said vertically extending chamber, said annular conduit means, and said inverted U-shaped annular passage may be filled with said clean fluid at the top of the well and said clean fluid in said chamber is uncontaminated by annulus fluids during insertion and residence of the tool in the well.

4,708,201

TOP ENTRY ELECTRICAL TRANSMISSION ASSEMBLY FOR SUBMERSIBLE PUMPING

Lehman T. Reed, 3505 Chester Ave., Bakersfield, Calif. 93301

Filed Oct. 29, 1984, Ser. No. 666,291

Int. Cl.[4] E21B *33/04;* H01R *4/64*

U.S. Cl. 166—65.1 4 Claims

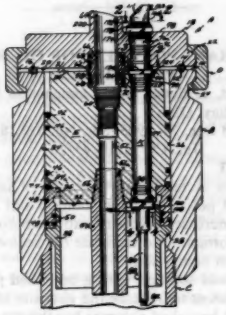
1. In a well apparatus including a casing head having an upper end, a tubing hanger supported in said casing head, said tubing hanger having a top and bottom surface and a first longitudinal bore extending therebetween, a bonnet mounted on said upper end, said bonnet having a top surface from which

a second longitudinal bore extends downwardly, said first and second longitudinal bores co-axially aligned, clamp means for removably securing said bonnet to said casing head, a moisture proof electric power transmission assembly for supplying electric power from a source exterior of said well head to an electric power receiving source below said tubing hanger, said moisture proof power transmission assembly including:

a. a lower electric power receiving connector assembly disposed below said tubing hanger and extending upwardly in said first bore, said lower connector assembly including a plurality of first, spaced, vertically extending engageable electrical conducting members and first resilient sealing means;

b. first means for rotatably supporting said lower electrical power receiving connector from said tubing hanger, with said first resilient sealing means in pressure contact with said tubing hanger to prevent moisture entering said first bore;

c. an elongate, generally cylindrical electrical transmission element disposed in both said first and second bores, said element including a plurality of spaced electrical conducting members that have upper and lower engaging end



portions, said lower engaging end portions in removable engagement with said first engageable electrical conducting members, and said element including second resilient sealing means which when in pressure contact with said tubing hanger prevent moisture entering the uppermost end of said first bore;

d. an upper electrical connector assembly that has an upper portion and a lower cylindrical portion that are angularly disposed relative to one another, said lower portion rotatably disposed in said second bore said upper connector including a plurality of spaced electrical conductors that have second engageable members that are disposed in said lower portion, said second engageable members in removable engagement with said upper end portions; and

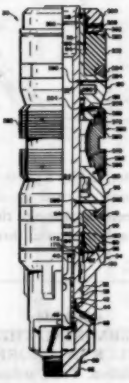
e. third sealing means to prevent the entry of moisture into the part of said second bore in which said second engageable member and upper engaging end portion are disposed, with said upper and lower connector assemblies and said electrical transmission element capable of being rotated as a unit relative to said well head apparatus to have said upper portion of said upper connector extend in a desired direction relative to said well head.

4,708,202

DRILLABLE WELL-FLUID FLOW CONTROL TOOL

Richard A. Sukup, Burleson, and Monty E. Harris, Azle, both of Tex., assignors to The Western Company of North America, Fort Worth, Tex.

Continuation of Ser. No. 611,341, May 17, 1984, abandoned.
This application Jul. 8, 1986, Ser. No. 884,877
Int. Cl.[4] E21B 23/00
U.S. Cl. 166—123 32 Claims



1. A tool for controlling the flow of fluid in a well casing in an oil or gas well comprising:

a tubular mandrel having a flow passage therethrough with means for connecting one end of the mandrel to the well drill string and with the second end having a flow control valve associated therewith,

a radially expandable seal member encircling and carried on said mandrel,

an abutment member attached to and movable with said mandrel for engaging one side of said seal member,

a bottom cone positioned around said mandrel and on the opposite side of said seal member from said abutment member, said cone having a sleeve extending therefrom and positioned between said seal and said mandrel and having a conical surface opposite said seal,

an upper cone positioned around said mandrel and having a conical surface confronting the conical surface of said bottom cone,

slip segments positioned around said mandrel and intermediate of said cones with conical surfaces for engagement with the conical surfaces of said cones, and

a lock hub positioned around said mandrel and on the side of said upper cone opposite said slip segments, said hub to receive applied pressure to move relative to said mandrel toward such slip segments causing radial movement thereof and the compression and radial expansion of said seal.

4,708,203

COMPOSITE DRILL COLLAR

John H. Walker, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 29, 1986, Ser. No. 868,409
Int. Cl.[4] F16L 57/00
U.S. Cl. 166—241 8 Claims

1. A collar of generally tubular configuration and of varying wall thickness, said collar having a first end, a second end, a longitudinal axis extending between the first end and the second end, an inside surface, and an outside surface, the inside surface being characterized by a generally radially inwardly extending flange or rib at a position adjacent the first end of the collar and a generally cylindrical inside surface portion extend-

ing between the generally radially inwardly extending flange or rib and the second end of the collar, said generally cylindrical inside surface portion being concentrically positioned around the longitudinal axis of the collar, the outside surface of

the collar being characterized by a portion of oval or elliptical cross-section, said portion of oval or elliptical cross-section having a major axis measured through the longitudinal axis of the collar and a minor axis measured through the longitudinal axis of the collar.

4,708,204

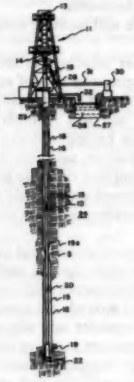
SYSTEM FOR DETERMINING THE FREE POINT OF PIPE STUCK IN A BOREHOLE

Stanley G. Stroud, Houston, Tex., assignor to NL Industries, Inc., New York, N.Y.

Continuation of Ser. No. 607,281, May 4, 1984, abandoned. This application Sep. 29, 1986, Ser. No. 912,698

Int. Cl.⁴ E21B *47/00*

U.S. Cl. 166—255 **24 Claims**



1. A method for detecting the location at which a ferromagnetic pipe string is stuck within a borehole, comprising the steps of:

passing a wireline tool through said pipe string, said wireline tool having disposed thereon a first exciter coil means and longitudinally spaced therefrom a second receiver coil means;

stressing and unstressing said pipe string above said stuck location while said wireline tool is being passed through said pipe string;

measuring a stressed magnetic permeability of the walls of each of two sections of said pipe string while said pipe string is stressed, one section located above and one section located below said stuck location, by inducing first eddy currents in said walls with said first coil means and detecting the electromagnetic field produced by said first eddy currents with said second coil means;

measuring an unstressed magnetic permeability of said walls of each of said sections while said pipe string is unstressed, by inducing second eddy currents in said walls with said first coil means and detecting the electromagnetic field produced by said second eddy currents with said second coil means; and

comparing said stressed and unstressed magnetic permeabilities for each said section.

10. An apparatus for use in detecting the location at which a ferromagnetic pipe string is stuck within a borehole, comprising:

an elongated housing having means at one end for engaging a wireline and adapted to be lowered through said pipe string into said borehole;

first exciter coil means for inducing eddy currents in the walls of a section of said pipe string, said inducing means disposed on said housing;

second receiver coil means for detecting the magnetic permeability of said section by measuring the electromagnetic field produced by said eddy currents, said detecting means disposed on said housing and spaced longitudinally from said inducing means; and

means for comparing two measured magnetic permeabilities of said section wherein one of said permeabilities is measured with said pipe string above said stuck location unstressed and the other of said permeabilities is measured with said pipe string above said stuck location stressed.

4,708,205

BRINE TOLERANT POLYMER FOR OIL RECOVERY APPLICATIONS

James E. Tackett, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

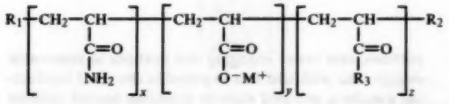
Filed Dec. 24, 1985, Ser. No. 813,181

Int. Cl.⁴ E21B *43/16*

U.S. Cl. 166—273 **8 Claims**

1. A process for increasing the viscosity of an aqueous partially hydrolyzed polyacrylamide solution and injecting said solution having increased viscosity into a subterranean hydrocarbon-bearing formation to facilitate the recovery of hydrocarbons therefrom comprising:

(a) providing said solution with a branched polymer in an amount sufficient to increase the viscosity of said solution wherein said branched polymer has the general formula:



where:

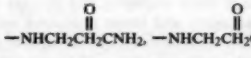
x is a fraction of amide groups in the branched polymer and has a value between about 0.9 and 0.5;

y is a fraction of carboxylate groups in the branched polymer and has a value between about 0.1 and 0.5;

z is a fraction of branched groups in the branched polymer and has a value greater than 0 and less than about 0.01;

R_1 and R_2 are either repeating amide, carboxylate, or branched groups in the stated fractions of x, y and z or a chain terminating hydrogen ion;

R_3 is a branching constituent selected from the group consisting of



and dimers and trimers thereof; and

M^+ is a cation of a hydrolyzing salt;

(b) injecting said solution containing said branched polymer and said partially hydrolyzed polyacrylamide into a wellbore in fluid communication with said subterranean hydrocarbon-bearing formation; and

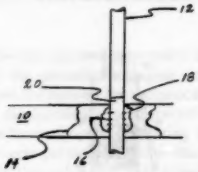
(c) displacing said solution into said formation to facilitate recovery of hydrocarbons therefrom.

4,708,206

REMOVING PARTICULATE MATTER FROM A NON-DISSOLUBLE SAND CONTROL PACK

Alfred R. Jennings, Jr., Plano, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 15, 1986, Ser. No. 919,120
Int. Cl.[4] E21B *37/08, 43/04*
U.S. Cl. 166—281 **10 Claims**



1. A process for removing particulate matter from a non-dissoluble sand control pack containing granulated ceramic material which pack is used to produce hydrocarbonaceous fluids from a subterranean formation comprising:

(a) placing a pumpable solidifiable gel mixture at the productive interval of said formation via a wellbore;

(b) causing said gel mixture to become a solid thereby forming a gel plug within said wellbore and a formation gel within said productive interval including said non-dissoluble pack sufficient to withstand environment formation conditions and pressures existing therein and cause hydrocarbonaceous fluids to cease flowing into said wellbore from said productive interval; and

(c) contacting said gel plug, said formation gel, and said pack with a solution of a mineral acid of a strength and composition sufficient to react with said gel plug, said formation gel, and particulate matter thereby solubilizing said gel plug, said formation gel, and removing said particulate matter thereby increasing the permeability of said pack without damaging said pack.

4,708,207

SCALE REMOVAL TREATMENT

Leonard J. Kalfayan, Claremont; David R. Watkins, Irvine, and Gregory S. Hewgill, Chino, all of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed Nov. 21, 1985, Ser. No. 800,532
Int. Cl.[4] E21B *37/06*
U.S. Cl. 166—295 **25 Claims**

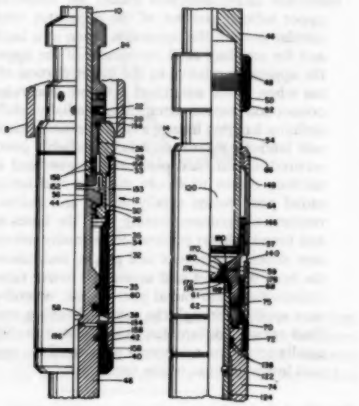
1. A method for treating a subterranean formation penetrated by a well, or for treating well equipment, comprising injecting into the well an aqueous composition containing at least one aminopolycarboxylic acid component and at least one water-soluble organosilicon compound.

4,708,208

METHOD AND APPARATUS FOR SETTING, UNSETTING, AND RETRIEVING A PACKER FROM A SUBTERRANEAN WELL

Floyd A. Halbardier, Pasadena, Tex., assignor to Baker Oil Tools, Inc., Orange, Calif.

Filed Jun. 23, 1986, Ser. No. 877,421
Int. Cl.[4] E21B *33/127, 33/13*
U.S. Cl. 166—387 **18 Claims**



1. A method for setting, unsetting, and retrieving an inflatable packer utilizing a downhole packer actuator assembly having an upper connector portion and a lower actuator portion, a remedial tubing string and a wireline in a subterranean well including a large diameter bore and a relatively small diameter tubing string, comprising:

structurally connecting the upper connector portion of the packer actuator assembly and the lower portion of the packer actuator assembly, the upper connector portion of the packer actuator assembly and the remedial tubing string, and the lower actuator portion of the packer actuator assembly and the inflatable packer,

thereby suspending the packer actuator assembly and the inflatable packer from the remedial tubing string;

lowering the inflatable packer while suspended from the remedial tubing string downhole through the small diameter tubing string and to a selected location within the subterranean well;

passing pressurized fluid through the remedial tubing string, the lower actuator portion, and to the inflatable packer to set the packer within the large diameter bore;

unsetting the inflatable packer;

passing pressurized fluid through the remedial tubing string and to the packer actuator assembly for releasing the upper connector portion of the packer actuator assembly from the lower actuator portion of the packer actuator assembly;

retrieving the upper connector portion of the packer actuator assembly from the subterranean well through the small diameter tubing string by raising the remedial tubing string from the well while the lower portion of the packer actuator assembly and inflatable packer remain within the well;

structurally interconnecting the wireline and the lower portion of the packer actuator assembly while positioned within the well;

retrieving the lower portion of the packer actuator assembly and the inflatable packer from the subterranean well through the small diameter tubing string by raising the wireline.

13. Apparatus for retrieving from a subterranean well an

inflatable packer of the type positionable within a large diameter well bore by passing through a smaller diameter conduit while suspended from a remedial tubing string and set by passing pressurized fluid to the packer through the remedial tubing string, comprising:

first connection means for structurally connecting an upper tubular portion of the apparatus with the remedial tubing string;

second connection means for structurally connecting a lower tubular portion of the apparatus with the packer;

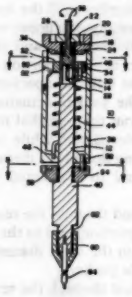
releasable interconnection means for interconnecting the upper tubular portion of the apparatus with the lower tubular portion the apparatus when in a latched position and for enabling axial movement of the upper portion of the apparatus relative to the lower portion of the apparatus when in the unlatched position; said releasable interconnection means comprising radially shiftable means defining latching means; a fluid pressure chamber adjacent said latching means; an axially shiftable piston shearably secured in said fluid pressure chamber and abutting said latching means to secure same in said latched position; radial port means axially above and below said piston respectively communicating with the bores of said upper and lower tubular portions to normally prevent any pressure differential across said piston; and means for sealing the bore of one of said upper and lower tubular portions intermediate said radial port means, whereby fluid pressure applied through the remedial tubing string applies a fluid pressure differential to said piston to shift said piston axially to release said upper portion of the apparatus from said lower portion of the apparatus.

4,708,209

MANUALLY OPERATED IMPACT DRIVER

Hugh M. Aspinwall, 2580 26th Ave., San Francisco, Calif. 94116

Filed Aug. 12, 1985, Ser. No. 764,579
Int. Cl.[4] B25D *15/00*
U.S. Cl. 173—93 **4 Claims**



1. A hand held tool for applying a rotational impact to a workpiece comprising

an elongate, generally cylindrical tool body,

means mounted on said body for engaging a workpiece,

means for storing energy mounted on said body and comprising a generally tubular sleeve that is mounted about a part of said body for rotary movement relative to said body, one of said sleeve and said body formed with an axially projecting member and the other of said sleeve and said body formed with a part having a slot in which said member can travel, the angular extent of said slot defining and limiting the relative angular movement between said sleeve and said body, spring means interposed between said sleeve and said body, said sleeve being rotatable about said body from one extreme position where said spring is in an at rest position to a second extreme position where said spring has energy stored therein, and releasable means for locking said sleeve against movement relative to said body in said second position,

said locking means being releasable to permit said spring to release its energy and to apply a force to urge relative rotary movement between said sleeve and said body,

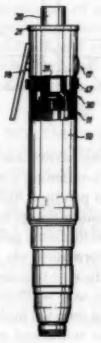
whereby when said sleeve is held stationary relative to said workpiece, said body is urged to rotate to apply rotational impact to said workpiece.

4,708,210

PNEUMATIC ROTARY TOOL

Erik R. Rahm, UpplandsVäsby, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Continuation of Ser. No. 712,343, Mar. 15, 1985, abandoned. This application Jan. 9, 1986, Ser. No. 817,176
Claims priority, application Sweden, Mar. 20, 1984, 8401528
Int. Cl.[4] B23B *45/04*
U.S. Cl. 173—169 **2 Claims**



1. A pneumatic rotary tool, comprising a housing having a cylindrical section, a reversible vane motor supported in the housing and rotating an output spindle, a pressure air supply passage in the cylindrical section of the housing communicating selectively with two alternative air inlet ports in a rear end wall of said motor, an exhaust air venting passage extending through the cylindrical section of the housing and communicating with an exhaust port means on said motor, a manually operable directional valve comprising a valve element which is rotatably supported in the cylindrical section of the housing so as to be shiftable by rotation in a plane transverse to the rotation axis of said motor between a "forward" position and a "reverse" position, a passage means extending substantially axially through said valve element to form a part of said pressure air supply passage, thereby connecting the latter to either of said air inlet ports as said valve element is shifted between said "forward" position and said "reverse" position, said valve element comprising a first portion which has a non-circular cross section and which is arranged to cooperate sealingly with said vane motor end wall, and a second portion having a circular cross section and being arranged to cooperate sealingly with the cylindrical section of the housing and to form a bearing means for rotatively supporting said valve element in the housing, said first portion of said valve element extending through a part of and being surrounded by said exhaust air venting passage and forming in said part of the exhaust air venting passage a partition means between said exhaust air venting passage and said pressure air supply passage.

4,708,211

REVERSIBLE AIR-OPERATED PERCUSSIVE ACTION MACHINE FOR DRIVING HOLES IN THE GROUND

Evgeny I. Shemyakin; Veniamin V. Kamensky; Alexandr D. Kostylev; Boris V. Sudnishnikov; Sergei K. Tupitsyn; Konstantin K. Tupitsyn; Vladimir D. Pavskikh, and Nikolai P. Chepurnoi, all of Novosibirsk, U.S.S.R., assignors to Institut Gornogo Dela So An SSSR, Novosibirsk, U.S.S.R.

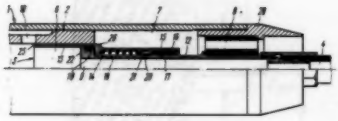
PCT No. PCT/SU84/00076, § 371 Date Oct. 24, 1985, § 102(e) Date Oct. 24, 1985, PCT Pub. No. WO85/03963, PCT Pub. Date Sep. 12, 1985

PCT Filed Dec. 28, 1984, Ser. No. 800,072

Claims priority, application U.S.S.R., Mar. 6, 1984, 3704451

Int. Cl.[4] E21B *4/14, 7/26*

U.S. Cl. 175—19 **4 Claims**



1. A reversible air-operated percussive action machine for driving holes in the ground comprising a cylindrical housing (1) in which there is disposed for reciprocations a hammer (2) defining inside the housing (1) a forward percussive action chamber (6) continuously communicating with an air feeding line (4) and a reverse percussive action chamber (5) communicating alternately through a hole (10) provided in the hammer (2) with the forward percussive action chamber (6) and the atmosphere, the hammer (2) having an air distributor (3) in the form of a guide tube (12) fixedly arranged inside the housing (1) and a valving member (13) spring-loaded relative to the guide tube and capable of opening and closing the hole (10) of the hammer (2) and provided with a lock means (15) for locking the valving member (13) relative to the guide tube (12) in two extreme positions providing for redistribution of air for the machine to operate in the forward and reverse percussive action modes, characterized in that the air distributor (3) comprises means for defining an accumulating chamber (18) between the valving member (13) and guide tube (12), means for communicating the accumulating chamber with the air feeding line (4), and an air restrictor for letting out air from the accumulating chamber when the supply of compressed air to the air feeding line (4) is terminated, the valving member being spring-loaded relative to the guide tube (12) by a spring means arranged so that when compressed air is fed to the accumulating chamber (18) a pressure force acts on the valving member (13) in a direction counter to the action of the spring means, said air restrictor placing said accumulating chamber (18) in constant communication with said air feeding line (4).

4,708,212

METHOD AND APPARATUS FOR OPTIMIZING DETERMINATION OF THE ORIGINATING DEPTH OF BOREHOLE CUTTINGS

James A. McAuley, Dallas, and Susan G. Eppler, Garland, both of Tex., assignors to TTE Holding Corp., Dallas, Tex.

Filed Mar. 4, 1986, Ser. No. 836,084

Int. Cl.[4] E21B *44/00*

U.S. Cl. 175—42 **17 Claims**

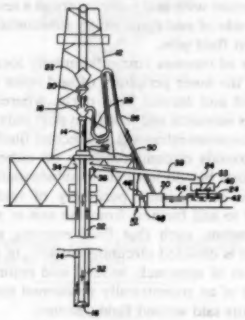
1. A method for determining the arrival at the surface of an identifiable material from a predetermined drilling depth independent of pump stroke rate and intermittent operations during the utilization of at least a drill bit, a positive displacement mud pump and drilling mud during the drilling of a well, said method comprising the steps of:

adding identifiable material to the drilling mud as the drilling mud is being pumped downwardly into the well;

initiate count of the pump strokes of the positive displacement mud pump as the previous step occurs;

observe arrival of the identifiable material at the surface of the earth as the drilling mud exits from the well;

observe the accumulated count of the pump strokes of the positive displacement mud pump which occur between step one and step three;



substract, from the accumulated count of the previous step, the number of pump strokes of the positive displacement mud pump required to pump the identifiable material down to the drill bit to establish a number of lag strokes; and

utilize the number obtained in the previous step to identify the arrival of drill cuttings from a predetermined depth.

4,708,213

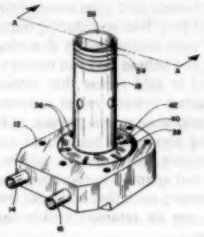
HYDRAULIC CORE CUTTING MOTOR

Lauren G. Kilmer, 1927 E. 35th Pl., Tulsa, Okla. 74105, and John W. Carter, Jr., 2556 S. Oswego, Tulsa, Okla. 74114

Filed May 22, 1986, Ser. No. 866,865

Int. Cl.[4] F21B *49/02*; F04C *2/39*

U.S. Cl. 175—78 **1 Claim**



1. In an apparatus for drilling core cutting from the sidewall of a drill hole wherein the apparatus comprises an elongated housing with a hydraulic operated back-up shoe mounted within the housing for wedging the housing at a selected location in the drill hole and a hydraulic motor with a drilling bit connected thereto for rotation by the hydraulic motor and hydraulic means mounted within the housing and connected to the hydraulic motor for moving the bit into drilling engagement with the sidewall of the drill hole,

(a) A hydraulic motor housing member containing a rotor cavity adapted to eccentrically receive a rotor means therein and further adapted to drive a rotor means be virute of fluid flow, wherein said hydraulic motor housing member further comprises:

(i) a first fluid channel passing from the outside of said hydraulic motor housing member to said rotor cavity in

a substantially tangential relationship to said rotor cavity and terminating at a first position of intersection with said rotor cavity as a first fluid port,

(ii) a second fluid channel passing from the outside of said hydraulic motor housing member to said rotor cavity in a substantially parallel relationship with said first fluid channel and in a substantially tangential relationship to said rotor cavity and terminating at a second position of intersection with said rotor cavity as a second fluid port on the side of said rotor cavity substantially opposite to said first fluid port,

(iii) a pair of recesses circumferentially located on a portion of the inner periphery of said rotor cavity nearest and first and second fluid ports, wherein one of said recesses inersects and first fluid port only and the other of said recesses intersects and second fluid port only and each extends circumferentially on either side of said fluid ports but do not extend substantially along those portions of the inner periphery of said rotor cavity nearest to and furthest from the axis of rotation of the rotor means, such that fluid entering said first fluid channel is directed circumferentially, in said tangential direction of approach, around said rotor cavity to the far side of an eccentrically positioned rotor means and then exits said second fluid channel;

(b) a rotor means adapted to be received eccentrically within said rotor cavity of said hydraulic motor housing and be driven by fluid entering said first fluid channel and exiting said second fluid channel, wherein said rotor means further comprises a plurality of substantially, radially oriented openings each adapted to receive a radially movable vane means therein and wherein each of said plurality of substantially, radially oriented openings have at least one fluid conduit in fluid communication with the innermost portion of substantially, radially oriented opening and adapted to establish fluif communication with said pair of recesses circumferentially located on a portion of the inner periphery of said rotor cavity during rotation of said rotor means and wherein said fluid conduit is positioned in a manner such as to establish fluid comunication behind a radially movable vane means occupying said substantially, radially oriented opening and said pair of recesses by directing relatively high pressure fluid flow into said opening and behind said vane means from said recess that intersects said first fluid port during outward radial movement of said vane means and by directing fluid flow from said opening and behind said van means to a relatively low pressure fluid in said recess that intersects said second fluid port during inward radial movement of said vane means each said vane means having, at its inner end, guid ears extending above and below said vane,

(c) a core retaining barrel means axially attached to said rotor means and adapted to receive a core cutting head at an outer extremity such that cores cut from the sidewall of a drill hole can be retained within said core retaining barrel means;

(d) a bearing plate means operatively attached to said hydraulic motor housing and adapted to hydraulically seal around said core retaining barrel means axially attached to said rotor means thus sealing the rotor means within said rotor cavity;

the improvement comprising:

(e) a guide groove of given depth and width in said hydraulic motor housing member on one side of said rotor means and a guide groove of the same said given depth and width in said bearing plate means on the other side of said rotor means, said guide grooves being concentric relative to said rotor cavity; and

(f) a guide ring for each of said guide grooves each said guide ring being of substantially the same said given depth and width so as to rotate in said guide grooves, a plurality of circumferentially spaced openings in said guide rings to receive said guide ears.

4,708,214

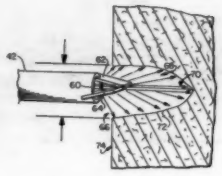
ROTATABLE END DEFLECTOR FOR ABRASIVE WATER JET DRILL

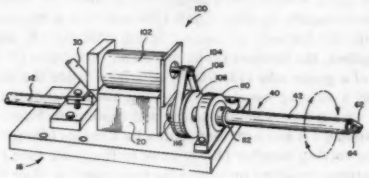
Walter G. Krawza, Lakeville; George A. Savanick, Apple Valley, and Steven W. Connors, Minneapolis, all of Minn., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Continuation-in-part of Ser. No. 699,513, Feb. 6, 1985, abandoned, and a continuation-in-part of Ser. No. 809,651, Dec. 16, 1985, Pat. No. 4,663,893. This application Aug. 22, 1986, Ser. No. 899,266

Int. Cl.[4] E21B *7/18, 10/60*

U.S. Cl. 175—424 **8 Claims**





1. An abrasive water jet drill comprising:

a base including a housing;

a jet means in said housing for producing a cylindrical water jet containing entrained abrasive material, said means including an elongate collimating tube extending through said housing which conducts the jet to a material to be drilled, said tube having an outlet from which the jet issues;

a first and a second wear resistant plate;

a first mounting means for mounting said plates on and at said outlet of said tube, said first plate being mounted on one side of said outlet such that a portion of the jet on that side is deflected by said first plate in a first forward and slight sidewards direction, said second plate being mounted on an opposite side of said outlet such that another portion of the jet is deflected in a forward and slight sidewards direction which last-mentioned sidewards direction is opposite to the first-mentioned sidewards direction, and said first and second plates being mounted such that said plates are separated from one another and still another portion of the jet passes between said plates undeflected;

a second mounting means for mounting said tube for rotation relative to said housing, said second mounting means including a sealing means between said housing and said tube; and

a rotating means for rotating said tube whereby the water jet exiting from the outlet of said tube acts as a drilling fluid.

4,708,215
AUTOMATIC WEIGHING SYSTEM

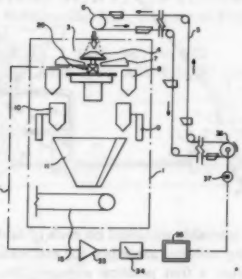
Toru Nakamura, Kyoto; Satoshi Konishi, Kusatsu; Seiji Yamada, Kyoto; Masahiko Tatsuoka, Siga, and Michihiro Kubo, Kusatsu, all of Japan, assignors to Ishida Scales Manufacturing Company, Ltd., Kyoto, Japan

Filed Aug. 5, 1985, Ser. No. 762,722

Claims priority, application Japan, Aug. 8, 1984, 59-164788; Nov. 6, 1984, 59-167485[U]; Nov. 12, 1984, 59-170328[U]

Int. Cl.[4] G01G *19/22, 13/16, 23/10;* **E16K** *31/52*

U.S. Cl. 177—25 **21 Claims**



1. An automatic weighing system comprising

one or more separate article batch handling means for receiving, weighing, storing and discharging individual article batches,

article feeding means serving to feed individual article batches to said separate article batch handling means,

a conveyor driving means for driving a conveyor means for transporting articles to said article feeding means,

a weight measuring means coupled to said article feeding means, and

conveyor control means serving to acquire weight information from said weight measuring means and controlling the motion of said conveyor control means according to said weight information.

4,708,216
BAG-FILLING MACHINE

Joachim Spiess, Hanover, Fed. Rep. of Germany, assignor to Natronag Gesellschaft fuer Verpackungssysteme mbH, Goslar, Fed. Rep. of Germany

Filed Dec. 22, 1986, Ser. No. 944,186

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1986, 3618648

Int. Cl.[4] G01G *19/00;* **B65B** *67/04*

U.S. Cl. 177—160 **4 Claims**

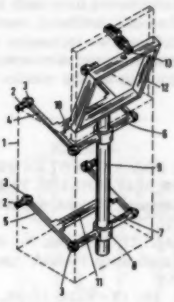
1. A bag-filling machine, comprising:

(a) an electronic weighing device having a force receiver which is secured to said bag-filling machine,

(b) a bag support column having a frame connected to the upper end of said support column, said frame having an upper crossbeam which is connected to and acting upon said force receiver,

(c) a bag support guide, comprising at least two upper parallel guides and at least two lower parallel guides, said guides being disposed in each instance on both sides of said bag support column, each guide having a bearing constructed as an articulated head disposed at each end thereof, one end of each guide is connected to a pin which is connected to the rear end of said machine frame, an upper axle connects the other end of each upper guide together and a lower axle connects the other end of each lower guide together, each axle being connected to said support column,

(d) an upper coupling rod rigidly connecting each upper parallel guide to one another, and



(e) a lower coupling rod rigidly connecting each lower parallel guide to one another.

4,708,217
EXTENSILE BEAMS FOR FLAT-SHAPED WEIGHING-MACHINES

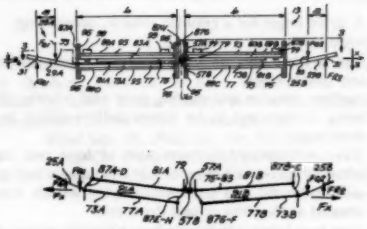
Miguel S. Andriewsky, Sucre 3601, (1430) Capital Federal, Argentina

Filed Jun. 5, 1986, Ser. No. 870,780

Claims priority, application Argentina, Jun. 21, 1985, 300769

Int. Cl.[4] G01G *3/14;* **G01L** *1/22*

U.S. Cl. 177—211 **9 Claims**



1. In a dynamometer machine for detecting the force magnitude of a load applied thereto, and including a pair of longitudinally elongated beam structure that bend under the effect of said load, each beam structure comprising:

two longitudinally moveable half-beam members, each of which has a respective end-portion for generating bending moments in said beam structure in response to said load,

interconnecting linkage means which in combination with said two half-beam members form a longitudinally elastic beam structure having an arcuate length which may vary to compensate the bending thereof under said load, and

means for measuring a parameter related to the bending moments in transverse sections of said beam structure and deriving said force magnitude therefrom; the improvement whereby:

each beam structure is longitudinally symmetrical about a transverse middle plane, and both half-beam members are coplanarly aligned with each other on opposite sides of said middle plane and adapted to receive forces derived from said load;

each beam structure further including a bridge member parallel to and vertically offset from both half-beam members, said bridge member comprising

a flexible middle zone bridging said middle plane and

two rigid outer zones connected respectively to the two half-beam via said linkage means;

said linkage means comprising a plurality of strip plates connecting in articulated form each outer zone with respective ones of said half-beam members in a manner substantially defining two rectangles; and

said detector means comprise mechanical deformation indicator means coupled to said middle zone of the bridge sheet.

4,708,218

DRIVE BOGIE FOR A CRAWLER VEHICLE AND A CRAWLER MAT FOR USE THEREWITH

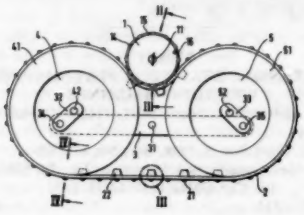
Markku Mäkelä, Tampere, Finland, assignor to Velsa Oy, Finland

Filed Apr. 22, 1986, Ser. No. 854,538

Claims priority, application Finland, Apr. 22, 1985, 851590; Apr. 11, 1986, 861537

Int. Cl.[4] B62D *55/08*

U.S. Cl. 180—9.5 **24 Claims**



1. A drive bogie for a crawler vehicle, comprising:

a bogie beam;

at least two carrying wheels freely rotatably suspended from said bogies beam;

an endless crawler mat passing over said wheels, said mat being constructed to be substantially resilient in every direction;

a drive roll situated between said at least two carrying wheels to press said crawler mat from above and between said driver roll and said two carrying wheels which are situated at the sides of said drive roll;

at least two intermediate members pivotally mounted upon said bogie beam, each wheel being suspended from a respective intermediate member,

said bogies being resilient by the joint effect of said resilience of said crawler mat and said suspension of said carrying wheels.

4,708,219

DISASSEMBLABLE SULKY FOR ATTACHMENT TO A STEERABLE FRONT WHEEL ASSEMBLY CONDITION

Thomas A. Cresswell, P.O. Box 834, Palm Desert, Calif. 92261

Filed May 9, 1986, Ser. No. 861,365

Int. Cl.[4] B62D *27/06;* **B62K** *5/06, 11/02*

U.S. Cl. 180—11 **31 Claims**

1. A collapsible three-wheeled, vehicle for the handicapped and others desiring assistance comprising:

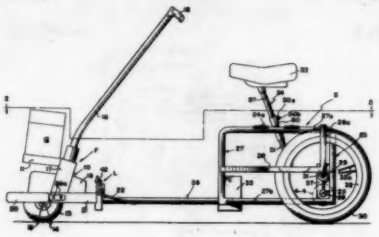
a. a front wheel drive unit comprising a steering column assembly with a motor driven wheel journaled on the lower end thereof, the assembly mounting a motor for driving the wheel;

b. a demountable towbar having a front-to-rear extending front portion, and a pair of transversely extending rear portions extending generally perpendicularly to said front portion, each portion terminating in a leg with a hoe-like blade fixed thereon at right angles to the leg and extending downwardly therefrom;

c. slit-like, transversely extending socket means on said steering column assembly, open at its upper end for receiving the blade on said front portion;

d. a pair of transversely spaced apart, separately demountable, front to-rear extending wheel frames, each having a stub axle for mounting a rear wheel, and journaling a rear wheel on its axle;

e. front-to-rear extending, slit-like socket means on each wheel frame open at its upper end for receiving one of the blades on the rear portions of said towbar;



f. a stop movably mounted on each of said wheel frames and steering column assembly for movement transversely to and from a first position engaging the upper portion of each said blade to prevent its disengaging movement out of said socket means and a remote location in which it does not prevent disengagement;

g. latch means for releasably locking each stop in its first position;

h. and a seat and brace means spanning and detachably secured to each of said wheel frames to integrate them and maintain them in rigidly spaced relation.

4,708,220

POWER STEERING CONTROL APPARATUS

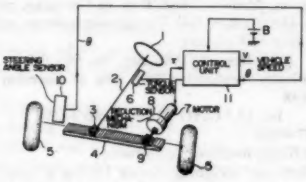
Yasuo Noto, and Shun-ichiro Sugimoto, both of Katsuta, Japan, assignors to Hitachi, Ltd. and Fuji Heavy Industries, Ltd., both of Tokyo, Japan

Filed Mar. 15, 1985, Ser. No. 712,030

Claims priority, application Japan, Mar. 16, 1984, 59-49260

Int. Cl.[4] B62D *5/04*

U.S. Cl. 180—142 **7 Claims**



1. A power steering control apparatus for a vehicle comprising:

means for detecting a steering force applied to a steering wheel and providing an output signal representative of the steering force;

means for detecting a steering angle of the vehicle wheels and providing an output signal representative of the steering angle;

an actuator operatively associated with a steering mechanism for the vehicle heels, with the steering wheel also being operativley associated with the steering mechanism; and

means operatively associated with the actuator for controlling continuously the actuator in accordance with speed of the vehicle, the steering force output signal and the

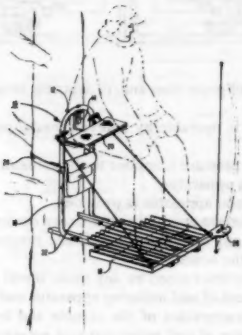
steering angle output signal to provide an assistant steering force and further in accordance with the steering angle output signal to provide an assistant restoring force, said controlling means controlling said actuator in accordance with a function having an offset with respect to said steering force so as to provide a dead region of said assistant steering force with respect to said steering force and an increasing ratio of said assistant steering force to said steering force with an increase of said steering force.

4,708,221

TREE STAND WITH PIN UP SYSTEM

Robert E. Kubiak, Robbinsville, N.J., assignor to Foxcraft, Inc., Robbinsville, N.J.

Filed Jan. 2, 1987, Ser. No. 152
Int. Cl.[4] A45F *3/26*; A01M *31/02*
U.S. Cl. 182—187 **24 Claims**



1. A tree stand with pin up system for attaching to a support object at a position elevated from the ground, comprising:
(a) frame means for providing a structure to attach all components of the tree stand;
(b) platform means attached to said frame means and aligned generally parallel to the ground adapted for supporting a user and equipment;
(c) hanger stud means projecting from said frame means for facilitating hanging of the tree stand on the support object; and
(d) pin up means for hanging said tree sand on said support object which includes:
(i) a screw section for penetrating into said support object;
(ii) cranking means for rotating said screw section; and
(iii) a stud holder having an aperture adapted for receiving said hanger stud means to hang said tree stand by said frame means on said support object.

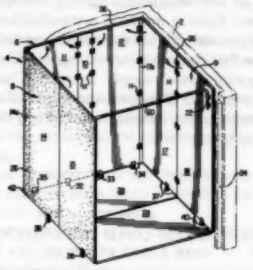
4,708,222

PROTECTIVE ELEVATOR SYSTEMS

Randall C. Bills, Richardson; Teddy E. Bumgardner, Irving; Lusbert L. Monroe, Dallas, and Jeffery D. Zimmermann, Garland, all of Tex., assignors to Beltway Construction, Inc., Dallas, Tex.

Filed Apr. 22, 1986, Ser. No. 854,591
Int. Cl.[4] B66B *9/00*
U.S. Cl. 187—1 R **15 Claims**

1. In a protective wall system for use in elevators, the combination comprising:
(a) an articulated backwall comprising structurally rigid panels including a central base panel and at least two wing wall panels hingedly connected to said base panel, the width of said base panel being substantially less then the width of said wing panels;
(b) first and second articulated sidewalls hingedly connected to the opposed ends of said backwall;
(c) the articulated backwall and the sidewalls of the protective wall system laying in a proximate contiguous relationship with adjacent interior surfaces of an elevator structure;
(d) each of said sidewalls having structurally rigid panels including at least two wall panels hingedly connected to



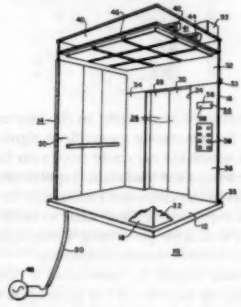
one another, the rearward wall panels in closest proximity to said backwall, when in the open position, folding inwardly toward each other and against the front surface of said backwall; and
(e) said wing panels of said backwall each adapted to receive one of said sidewalls with the wall panels thereof folded together whereby said protective wall system can be folded into a compact position in which said folded sidewalls and said backwall wing panels are in juxtaposition.

4,708,223

EMERGENCY LIGHTING FOR ELEVATOR CAB

Karl B. Orndorff, Bonneauville Boro, and Paul L. Baldwin, Franklin Township, Adams County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 29, 1986, Ser. No. 912,855
Int. Cl.[4] B66B *7/00*; H05B *37/04*
U.S. Cl. 187—1 R **7 Claims**



1. An elevator cab, comprising:
a platform,
upstanding front, rear, and side wall portions on said platform having inner surfaces defining an enclosure having a passenger entrance opening to the inside of said enclosure,
a first electrical power supply for said cab,
lighting means in said cab connected to said first electrical power supply,
an emergency power supply carried by said cab which provides electrical power in response to failure of said first electrical power supply,

and emergency lighting means in said cab,

said emergency lighting means being movable between first and second positions which respectively conceal and expose the emergency lighting means, with respect to the inside of said enclosure,

said emergency lighting means being electrically connected to both said first electrical power supply and to said emergency power supply,

said first electrical power supply controlling the physical position of said emergency lighting means such that the emergency lighting means is normally in said concealed first position, moving to said exposed second position only when the first electrical power supply fails,

said emergency power supply energizing said emergency lighting means to illuminate the inside of said enclosure via said emergency lighting means when the first electrical power supply fails.

4,708,224

APPARATUS FOR THE LOAD DEPENDENT CONTROL OF AN ELEVATOR

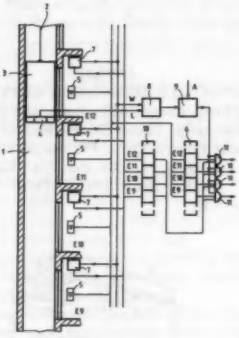
Joris Schrooder, Lucerne, Switzerland, assignor to Inventio AG, Hergiswil, Switzerland

Filed Apr. 9, 1986, Ser. No. 849,958

Claims priority, application Switzerland, Apr. 22, 1985, 01713/85

Int. Cl.[4] B66B *1/16*

U.S. Cl. 187—122 **20 Claims**



1. In an apparatus for controlling an elevator car including a selector device for generating a next floor signal representing the next floor at which the car could stop, a car load measuring device for generating a car load signal representing the number (L) of passengers in the car, a floor memoroy for generating a floor call signal representing floor calls to be serviced by the car, and control means for generating a stop signal to stop the elevator car, the control means comprising:

floor load sensor means for generating a floor load signal representing the number (W) of passengers waiting at the next floor at which an associated elevator car could stop; and

means responsive to said floor load signal, a floor call signal for the next floor, a car load signal representing the number (L) of passengers in the associated elevator car, and a next floor signal for the associated elevator car for generating a stop signal when the sum of said floor load signal and the car load signal is less than or equal to a predetermined passenger load value (A), $(L+W) \leqq A$, and for not generating said stop signal when said sum exceeds said load value, $(L+W) > A$.

4,708,225

OVERLOAD PROTECTION AND/OR WARNING ARRANGEMENT

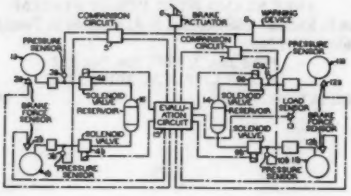
Joachim Feldman, Neustadt, and Manfred Schult, Garbsen, both of Fed. Rep. of Germany, assignors to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Filed Jan. 29, 1986, Ser. No. 823,717

Claims priority, application Fed. Rep. of Germany, Jan. 29, 1985, 3502825

Int. Cl.[4] B60T *17/22*

U.S. Cl. 188—1.11 **8 Claims**



1. (a) Overload protection and/or warning arrangement for a vehicle brake;

(b) the brake is operable by applying brake pressure to an actuator;

(c) said brake pressure is applied to the actuator by means of an initiating apparatus;

(d) a comparison apparatus is provided;

(e) said comparison apparatus compares a design brake pressure P(design) with the actual brake pressure P(actual) applied to the actuator;

(f) P(design) is determined by any given travel of a manipulating element of said initiating apparatus and by the operational characteristics of the vehicle and by the design characteristics of said brake and said actuator;

(g) P(actual) is the brake pressure actually applied to the actuator for said given travel of said manipulating element;

(h) said comparison apparatus produces a warning signal when P(actual) differs by a predetermined amount from P(design).

4,708,226

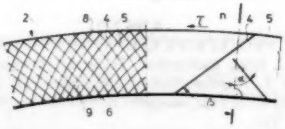
BRAKE LINING, PARTICULARLY FOR A VEHICLE DRUM BRAKE

Jánosdeák Egon; Gergely Tibor, and Szabó János, all of Budapest, Hungary, assignors to Autoipari Kutato es Fejleszto Vallalat, Budapest, Hungary

Filed Mar. 12, 1987, Ser. No. 24,868

Int. Cl.[4] F16D *69/02*

U.S. Cl. 188—251 A **3 Claims**



1. A brake lining for a drum brake having a surface of rotation, (a) said brake lining having a frictional surface of arcuate contour generally matching the surface of rotation of the brake drum and having a supporting surface on the opposite side for affixation to a carrying member, (b) said brake lining frictional surface having an axis generally coincident with the axis of rotation at said brake drum, (c) the material of the frictional brake lining comprising a plurality of adjacent web sheets including embedded oriented reinforcing elements in a fila-

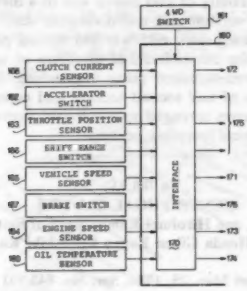
ment-rod-like formation, (d) said reinforcing elements being made of a material having a modulus of elasticity which is larger by at least one order of magnitude than the modulus of elasticity of the material of the brake lining, (e) said web sheets arranged and configured such that the reinforcing elements contained therein are so oriented that the projections of at least 60% of such reinforcing elements falling onto a plane normal to the axis of the frictional surface enclose an acute angle in the range between 20° and 70° with a plane normal to the frictional surface.

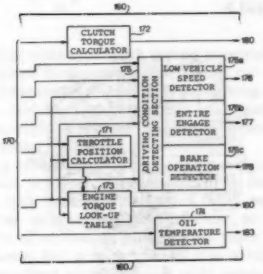
4,708,227

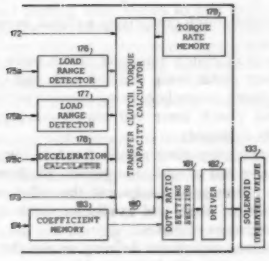
SYSTEM FOR CONTROLLING A TRANSFER CLUTCH OF A FOUR-WHEEL DRIVE VEHICLE

Nobumitsu Kitade, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 24, 1986, Ser. No. 855,988
Claims priority, application Japan, Apr. 30, 1985, 60-92979
Int. Cl.[4] B60K *41/28*
U.S. Cl. 192—0.055 **17 Claims**







1. In a control system for a four-wheel drive vehicle having an engine with a crankshaft, a transmission with an input shaft and an output shaft, a main clutch operatively connected to the crankshaft of the engine and to the input shaft of the transmission for transmitting output of the engine to the transmission, the improvement in the system comprising:

a variably engageable transfer clutch operatively connected to the output shaft of the transmission and to a power transmitting train for providing a four-wheel drive power train, the transfer clutch having a controllable clutch torque capacity at different engagement degrees of the transfer clutch;

a vehicle speed sensor for detecting vehicle speed and producing a vehicle speed signal dependent on the vehicle speed;

means for producing a brake signal at braking of the vehicle;

first means for providing an engine torque signal, representing engine torque, dependent on an operating condition of the vehicle;

second means responsive to the vehicle speed signal for producing a deceleration signal dependent on deceleration of the vehicle; and

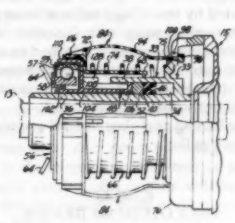
control means responsive to the brake signal, the deceleration signal and the engine torque signal for engaging the transfer clutch at different torque capacities which are determined as different predetermined rates of the engine torque in accordance with different values of the deceleration represented by the deceleration signal.

4,708,228

BEARING SUPPORT FOR MOTOR VEHICLE CLUTCH CONTROL APPARATUS

Keith V. Leigh-Monstevens, Troy, Mich., assignor to Automotive Products plc, Warwickshire, England

Continuation of Ser. No. 653,313, Sep. 20, 1984, abandoned, which is a continuation-in-part of Ser. No. 477,161, Mar. 21, 1983, Pat. No. 4,585,108. This application Feb. 20, 1987, Ser. No. 17,020
Int. Cl.[4] F16D *25/063, 25/08*
U.S. Cl. 192—85 CA **11 Claims**



1. A clutch operating mechanism comprising a carrier member and a throw-out bearing mounted on one end of said carrier member, said throw-out bearing having a non-revolving race held by said carrier member and a revolving race engaged with a clutch mechanism release fingers, said carrier member being disposed slidably over a tubular member surrounding a drive shaft connecting a clutch mechanism to a transmission, said carrier member being in the form of a first sleeve slidably disposed around said tubular member, said first sleeve having an enlarged first end including means for mounting the non-revolving race of said throw-out bearing thereon and a radially outwardly extending circumferential flange, a dust cover member in the form of a second sleeve surrounding said first sleeve, said second sleeve having a rim at one end thereof surrounding said flange of said first sleeve, means attaching said second sleeve to said first sleeve, resiliently deflectable retaining means enabling the non-revolving race of said throw-out bearing to be installed on said first end of said first sleeve by momentarily resiliently deflecting said retaining means during

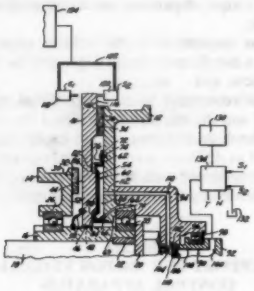
mounting of the non-revolving race of said throw-out bearing on said first end of said first sleeve, said non-revolving race of said throw-out bearing being held by said retaining means on said first end of said first sleeve in abutting relation to said radially outwardly extending circumferential flange.

4,708,229

DOUBLE ACTING CLUTCH

Andrew G. Anderson, London, and Leigh A. Shoji, Chatham, both of Canada, assignors to Canadian Fram Limited, Chatham, Canada

Filed Jul. 31, 1986, Ser. No. 892,530
Int. Cl.[4] F16D *25/11, 23/14*
U.S. Cl. 192—87.17 **14 Claims**



1. A clutch comprising:
a first and a second pulleys rotationally isolated from an input shaft, and adapted to be drivingly connected to said input shaft;
a plate rotatable with said input shaft and axially movable thereon between a first position in engagement with said first pulley and a second position in engagement with said second pulley;
means supported by one of said pulleys for urging said plate to move into engagement with the other of said pulleys, including a rolling diaphragm attached to said one pulley defining an activation chamber therebetween, and said means for communicating and modulating pressurized fluid to said activation chamber; and
bias means for biasing said plate toward and into engagement with said one pulley.

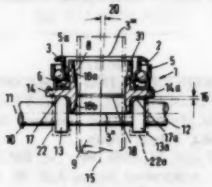
4,708,230

DECLUTCHING DEVICE

Paul Maucher, Sasbach, Fed. Rep. of Germany, assignor to Luk Lamellen und Kupplungsbau GmbH, Bühl, Fed. Rep. of Germany

Continuation of Ser. No. 592,232, Mar. 22, 1984, abandoned. This application Sep. 17, 1986, Ser. No. 910,284
Claims priority, application Fed. Rep. of Germany, Mar. 24, 1983, 3310630
Int. Cl.[4] F16D *23/14*
U.S. Cl. 192—98 **19 Claims**

1. A declutching device, especially for clutches of motor vehicles, comprising an elongated guide having an external surface of unchanging contour, as considered in the longitudinal direction of said guide; a disengaging unit including a sleeve having an axis and being movable longitudinally of said guide, said sleeve having two motion receiving portions disposed substantially diametrically opposite each other and an internal durface surrounding said guide with freedom of rocking movement substantially exclusively in a predetermined plane including the axis of said sleeve and intersecting said motion receiving portions and without freedom of rocking movement in a second plane which includes the axis of said sleeve and is normal to said predetermined plane, said internal surface including a first section closely adjacent to the external surface of said guide and said sleeve having a portion which is adjacent to and is maintained by said first section in a predetermined position in the radial direction of the guide, said internal surface further including a second section adjacent to said first section, said second section having first and second portions



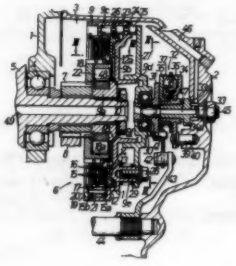
which diverge axially of said sleeve and in a direction away from said first section and non-divergent third and fourth portions alternating with said first and second portions, said considered in the circumferential direction of said external surface, said predetermined plane intersecting the first and second portions of said second section; and actuating means including two arms arranged to move said sleeve axially by way of said motion receiving portions.

4,708,231

CENTRIFUGAL CLUTCH

Takanori Onda, and Hirofumi Kambe, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 25, 1986, Ser. No. 843,701
Claims priority, application Japan, Apr. 2, 1985, 60-69496
Int. Cl.[4] F16D *43/284*
U.S. Cl. 192—103 F **5 Claims**



1. A centrifugal clutch comprising a clutch inner;
a clutch outer;
a arrangement of clutch inner and clutch outer plates, said clutch inner plates being coupled with said clutch inner and said clutch outer plates being coupled with said clutch outer, said clutch inner and clutch outer plates being alternately arranged;
a pressure receiving plate axially fixed in the clutch and adjacent one end of said arrangement of plates;
an annular piston axially adjacent the other end of said arrangement of plates and axially moveable to compress said arrangement of plates;
a cylinder about said piston defining an annular cavity axially between said cylinder and said piston;
an oil inlet to said cavity at the inner periphery thereof;
an oil outlet from said cavity at the outer periphery thereof, said cavity expandible and contractable by oil flowing into

and out of said cavity, respectively, through said oil inlet for axially moving said piston;

a spool type valve disposed within said oil outlet and slidable in a bore oriented parallel to the axis of rotation of said clutch between an open position and a closed position said valve biased into a closed position thereby closing said oil outlet; and

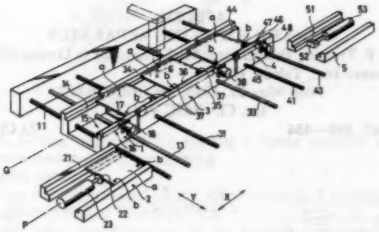
mechanically operated means for selectively controlling said valve including an operating plate rotatable together with said clutch outer about the axis of rotation of said clutch, said operating plate abutting said spool valve, and cam means for reversably axially biasing said operating plate against said spool valve, said valve thereby displaceable to said open position to release oil pressure generated within said cavity.

4,708,232

MOVING TABLE TYPE WORK SYSTEM

Kanji Hata; Eiji Itemadani, and Masahiro Maruyama, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Mar. 19, 1986, Ser. No. 842,362
Claims priority, application Japan, Mar. 20, 1985, 60-56742
Int. Cl.[4] B65G *47/52*
U.S. Cl. 198—346.1 **8 Claims**



1. A moving table type work system comprising:

(a) work-piece feeding means for sending out a work piece;

(b) work table means provided for performing a work operation on said work piece thereon, said work table means being arranged to provide two degrees of freedom for said work piece;

(c) feeding table means for transferring said work piece fed from said work-piece feeding means to said work table means, said feeding table means being reciprocated in directions substantially perpendicular to the working direction of movement of said work piece on said work table means and coming initially into unidirectional unitary movement with said work table means in one of the directions that provide the two degrees of freedom for said work piece when said feeding table means is adjacent said work table means so that said work piece is shifted from said feeding table means to said work table means, whereby the two degrees of freedom is provided for said work piece without interruption during the shift of said work piece from said feeding table means to said work table means;

(d) work-piece receiving means for receiving said work piece; and

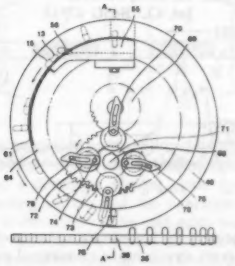
(e) discharging table means for transferring said work piece from said work table means to said work-piece receiving means, said discharging table means being reciprocated in directions substantially perpendicular to the working direction of movement of said work piece on said work table means and coming into unitary movement with said work table means in one of the directions that provide the two degrees of freedom for said work piece when said discharging table means is adjacent said work table means so that said work piece is shifted from said work table means to said discharging table means, whereby the two degrees of freedom is provided for said work piece without interruption during the shift of said work piece from said work table means to said discharging table means.

4,708,233

METHOD AND APPARATUS FOR ARRANGING CAPPED CAPSULES IN A SINGLE DIRECTION

Kohei Nomura, Kobe, Japan, assignor to Kabushiki Kaisha Osaka Jidoki Seisakusho, Osaka, Japan

Division of Ser. No. 549,814, Nov. 8, 1983, abandoned. This application May 15, 1986, Ser. No. 867,428
Claims priority, application Japan, Sep. 30, 1983, 58-183302
Int. Cl.[4] B65G *47/24*
U.S. Cl. 198—397 **3 Claims**



1. An apparatus for arranging capped capsules in a definite direction, said capsules having a cap portion which is larger than a body portion, comprising:

a rotatable drum having an outer surface and an inner surface, said drum having capsule receiving holes located around the outer circumference of said drum, said receiving holes passing from said outer surface to said inner surface, each of said receiving holes opening into a slot having a width large enough to allow only a capsule body portion to pass therethrough;

a tumbling device having an upper surface which is located below the inner surface of said drum but which allows said drum to pass freely thereover, said tumbling device having a groove in said upper surface which is located below the inner surface of said drum, said groove having a width large enough to allow only the capsule body portion to pass therethrough, said groove having a depth which decreases in the direction of rotation of said drum such that the body portion of a capsule will be urged up and turned so that the capsule body portion enters said slot of a receiving hole;

adjusting pawls caused to enter said receiving holes to turn each capsule with its body portion located in said slot to a position with the body portion facing the outer circumference of said drum, the number of said pawls being less than the number of receiving holes in said drum, each of said pawls having a top end opposite to a base portion and a groove in the middle thereof;

means for turning an individual pawl comprising a pin which is pivotably attached to the base portion of a pawl, a small disk which is connected to said pin at an eccentric position on said disk;

planetary gear means for rotating said disk, a cup which is within and rotatably connected to said rotatable drum, said cup connected to said planetary gear means for causing said disk to rotate, a guide pin fixedly attached to said cup, said guide pin passing through said groove of one of said pawls;

whereby said turning means causes each pawl to enter a receiving hole and turn a misaligned capsule so that the body portion faces the outer circumference of said drum;

whereby capped capsules which were randomly supplied to receiving holes in a single revolving drum fall freely from the receiving holes with their cap portions all facing the same direction.

4,708,234

ARRANGEMENT FOR CONVERTING A MULTI-TRACK STREAM OF BOTTLES INTO A SINGLE-TRACK STREAM OF BOTTLES

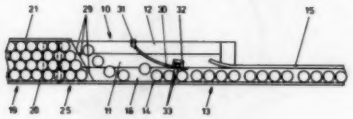
Gerhard Born, Bingen, and Klaus Kaiser, Neu-Bamberg, both of Fed. Rep. of Germany, assignors to Seitz Enzinger Noll Maschinenbau Aktiengesellschaft, Mannheim, Fed. Rep. of Germany

Filed Sep. 13, 1985, Ser. No. 776,018

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1984, 3433920; Dec. 13, 1984, 3445543

Int. Cl.[4] B65G *47/12*

U.S. Cl. 198—453 **15 Claims**



1. An arrangement for converting a stream of bottles delivered as a multi-track stream into a transitional stream of bottles which is to be withdrawn as only a single-track stream; an intermediate conveyer is disposed between a feeding mechanism, which is provided with first guide means, and a withdrawal mechanism, which is provided with second guide means; the upper sides of the conveyer belt system of said intermediate conveyer form a conversion region in common therewith that includes a common transport surface and that is in the shape of an inclined plane which is inclined transverse to the direction in which bottles are conveyed from the upper side of said feeding mechanism to the upper side of said withdrawal mechanism having a conveying surface therewith, whereby those guide means of said feeding and withdrawal mechanisms of the low-lying side of said inclined plane are interconnected;

the improvement wherein said withdrawal mechanism includes a conveyer belt having an upper side, with said inclined plane conversion region being formed by the combination of said upper side of said conveyer belt system of said intermediate conveyer in part, and said upper side of said conveyer belt of said withdrawal mechanism in part; said conversion region has a track width which corresponds to the track width of said feeding mechanism, is disposed downstream of the later when viewed in the direction in which said bottles are conveyed, and has its plane essentially coincide in level and track stream with said feeding mechanism; that portion of that second guide means of said withdrawal mechanism which is disposed in said conversion region provides for a linear connection of said guide means of said feeding and withdrawal mechanisms of the low-lying side of said inclined plane conversion region for automatic and pressureless sloped-down-driving-away of the bottles in only the single-track stream;

said conveyer belt of said withdrawal mechanism being an endless belt, and said conveyer belt system of said intermediate conveyer being an endless belt system, each of which has an upper and lower side with a return from the upper side to the lower side, and a return from the lower side to the upper side; that return of said withdrawal mechanism from the lower side to the upper side thereof being disposed in the vicinity of that return of said intermediate conveyer from the lower side to the upper side thereof, so that that conveying surface of said withdrawal mechanism adjacent to said intermediate conveyer forms said common conversion region with said upper sides of said conveyer belt system of said intermediate conveyer; said feeding mechanism also including a conveyer belt system which is an endless belt system having an upper side and a lower side with a return from the upper side to the lower side, and a return from the lower side to the upper side; when viewed in the direction in which said bottles are conveyed by said intermediate conveyer, that return of said feeding mechanism from the upper side to the lower side being disposed upstream of those returns of said intermediate conveyer and said withdrawal mechanism from the lower side to the upper side; the upper sides of said conveyer belt system of said feeding mechanism conform to the inclination of the common transport surface of said conversion region in such a way that the low-lying sides of said feeding and withdrawal mechanisms are aligned with one another to effect said linear connection of said guide means of said feeding and withdrawal mechanisms; and an essentially planar transition mechanism which is disposed in the transition region from the upper sides of said conveyer belt system of said feeding mechanism to said common conversion region, with said transition mechanism also being essentially coplanar with the upper sides of said conveyer belt system of said intermediate conveyer, and with the upper side of said conveyer belt of said withdrawal mechanism.

4,708,235

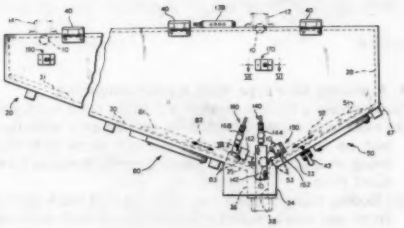
CLOSURE HANDLING APPARATUS

Alois F. Trendel, Temperance, Mich., assignor to Owens-Illinois Closure Inc., Toledo, Ohio

Filed May 21, 1985, Ser. No. 736,603

Int. Cl.[4] B65G *47/12*

U.S. Cl. 198—454 **23 Claims**



1. Apparatus for improving the process of supplying closures in a predetermined oriented position and at high feed rates to a successive packaging or high speed capping application station, comprising;

(a) means for feeding closures from a plurality of closure sorting and orienting means,

(b) a hopper means for receiving closures from said plurality of sorting and orienting means having top, bottom and side wall means and enclosing panels spaced to maintain closures in an oriented position in a single layer,

(c) said bottom wall having a continuously open discharge chute means formed therein which is remote from said plurality of closure feeding means, and

(d) means for displacing closures in said layer from bridging and jamming patterns in said hopper means including means for positively urging closures from said layer toward and through said open discharge chute in a continuous stream at a rate faster than an individual sorting an orienting means supplies closures to said hopper means,

(e) said positive urging means including first and second slide members disposed along said bottom wall of said hopper means and on opposite sides of said discharge chute means, and means for imparting reciprocal motion to said slide members toward and away from said dis-

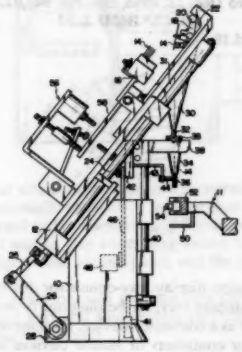
charge chute means which alternately moves each slide member toward said chute means while leaving said chute open.

4,708,236

LINEAR MEMBER FEEDING APPARATUS

Isao Shiraishi, Yokosuka, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 7, 1985, Ser. No. 742,523
Claims priority, application Japan, Jul. 27, 1984, 59-114520
Int. Cl.[4] B65G *25/00*
U.S. Cl. 198—468.2 **3 Claims**



1. A feeding apparatus for feeding a linear member to a predetermined position, comprising:

support means;

storage means, mounted on the support means, for storing a number of linear members;

a fixed guide chute attached to the support means and extending substantially in the vertical direction, said fixed guide chute having an inlet port at the top end thereof and an outlet port at the bottom end;

extracting means movably disposed on the support means and adapted to extract the linear members one by one from the storage means and drop the linear members into the inlet port of the fixed guide chute;

a supporting member supported by the support means to be movable between an upper position and a lower position;

first drive means for moving the supporting member between said upper and lower positions;

a movable guide chute for guiding the linear member dropped from the fixed guide chute to the predetermined position, said movable guide chute having an inlet port and an outlet port at the top and bottom ends thereof, respectively, and being mounted on the supporting member to be movable integral with the supporting member and located below the fixed guide chute, said movable guide chute receiving each of said linear members dropped from the fixed guide chute when the supporting member moves to the upper position and said outlet port of the movable guide chute being located close to the predetermined position when the supporting member moves to the lower position;

holding means having a magnet supported by the supporting member to be movable integral with the supporting member and to be movable between an attracting position near the movable guide chute and a releasing position distant from the movable guide chute, for holding the linear member dropped into the movable guide chute when the movable guide chute is in the upper position and releasing its hold of the linear member when the movable guide chute is moved to the lower position; and

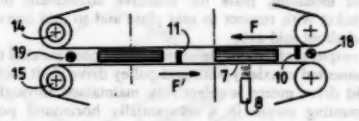
second drive means for moving the magnet to the attracting position when the supporting member is in the upper position and moving the magnet to the releasing position when the supporting member is in the lower portion.

4,708,237

PROCESS AND DEVICE FOR SUPPLYING AN OPERATION STATION WITH A SUCCESSION OF GUIDED ARTICLES

Claude Buisson, Ocioet, and Jean-Alain Delafoy, Fleury les Aubrais, both of France, assignors to Societe Nationale d'Exploitation Industrielle des Tabacs et Allumettes, France

Filed Mar. 29, 1985, Ser. No. 717,453
Claims priority, application France, Apr. 2, 1984, 84 05273
Int. Cl.[4] B65G *19/00*
U.S. Cl. 198—726 **5 Claims**



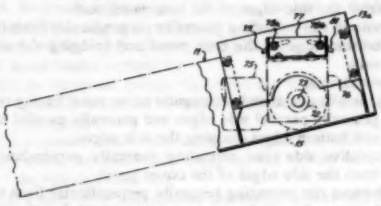
1. A device for supplying an operation station with a succession of articles, comprising an article feeding station, an operation station, and a discharge station, guide means disposed between the feeding station and the operation station, first means movable in translation along said guide means for pushing each article, and second means movable in translation along said guide means for braking each article pushed by said first means so that the article stops at the operation station, and for discharging the preceding article from said operation station, wherein said first and second means comprise first and second lugs fixed to first and second endless belts, said belts being operable in a first cycle to push said article with said first lug, to brake said article with said second lug and to discharge the preceding article with said second lug, said belts being operable in a second cycle to push said article with said second lug, to brake said article with said first lug and to discharge the preceding article with said first lug, and control means for alternately operating said belts in each said cycle.

4,708,238

CLEATED CHANNEL BELT CONVEYOR

Marten Bultman, Crestwood, and Edwin L. Wilding, Louisville, both of Ky., assignors to Griffin & Company, Inc., Louisville, Ky.

Division of Ser. No. 502,183, Jun. 8, 1983, abandoned. This application Apr. 17, 1985, Ser. No. 724,081
Int. Cl.[4] B65G *23/04*
U.S. Cl. 198—835 **7 Claims**



1. An elongated belt conveyor of the type having side frames a belt drive pulley mounted on a pulley drive shaft having an axis between the side frames at a drive end of said conveyor, a belt idler pulley mounted on the frames at another end of said conveyor, an endless belt mounted around said pulleys, and drive means, including a motor, having an output shaft for rotating said pulley drive shaft and drive pulley, said conveyor further including means for supporting said drive means in a

horizontal position independently of any longitudinal inclination of said conveyor and side frames and comprising:

a mounting plate separate from but secured to and supported by one of said frames at the drive end of said conveyor;

a drive means support bracket adjustably secured to said mounting plate for selective disposition with respect thereto;

said mounting plate being disposed in a plane between said one side frame and said support bracket;

said drive means mounted on and supported on said conveyor by said support bracket;

at least one arcuate slot in one of said mounting plate and said support bracket, said slot being in the shape of an arc of a circle having a focus on the drive shaft axis of the drive pulley; and

fastener apparatus interconnecting said support bracket to said mounting plate for selective adjustment of said bracket with respect to said plate and to said conveyor, and about said axis;

said output shaft of said drive means disposed parallel to and connected coaxially with said pulley drive shaft such that said drive means is selectively maintained through said mounting means in a substantially horizontal position independently of any longitudinal inclination of said conveyor.

4,708,239

LATCHING STORAGE/DISPLAY BOX FOR DISKETTES OR THE LIKE

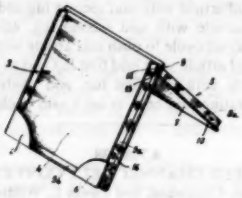
Jean Bourbon, Saint Lupicin, France, assignor to Ets. A. Bourbon et Fils, Saint Lupicin, France

Filed Oct. 1, 1986, Ser. No. 914,086

Claims priority, application France, Oct. 1, 1985, 85 14978

Int. Cl.[4] B65D 79/00

U.S. Cl. 206—45.13 **5 Claims**



1. A storage/display box comprising:

a base having

a generally planar and rectangular base panel having two generally parallel side edges and generally parallel top and bottom edges bridging the side edges,

respective side rims extending generally perpendicular from the side edges of the base panel, and

a bottom rim extending generally perpendicular from the bottom edge of the base panel and bridging the side rims;

a cover having

a generally planar and rectangular cover panel having two generally parallel side edges and generally parallel top and bottom edges bridging the side edges,

respective side rims extending generally perpendicular from the side edges of the cover panel,

a bottom rim extending generally perpendicular from the bottom edge of the cover panel and bridging the side rims, and

a top rim extending at an angle substantially greater than 90° from the top edge of the cover panel parallel to the respective bottom rim and bridging the side rims and having an outer edge;

a hinge web integrally formed with the cover and base between the outer edge of the cover top rim and the top edge of the base panel, the cover and base being movable between a closed position with the panels substantially parallel and the rims of one of the panels nested within the rims of the other panel and a use position with the top rim of the cover lying against the base panel and the panels extending at an acute angle to each other; and

means including interengaging latch formations on the cover and base for releasably securing the cover and base in the use position.

4,708,240

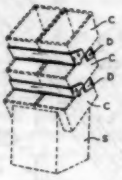
COMBINATION DISPLAY TRAY-CONNECTOR DEVICE

Paul J. McMahon, St. Charles, and Heidi A. Sandusky, Chicago, both of Ill., assignors to Container Corporation of America, Chicago, Ill.

Filed Dec. 22, 1986, Ser. No. 945,022

Int. Cl.[4] B65D 5/50

U.S. Cl. 206—45.18 **6 Claims**



1. A combination display tray-connector device that can be used alone as a display tray, for holding one or more articles to be displayed, or as a connector device, for interconnecting and supporting other containers or similar devices in a vertically stacked arrangement, said device being formed from a unitary blank of foldable sheet material, such as paperboard, and not requiring outside fastening means, said container comprising:

(a) a generally rectangular bottom wall panel disposed to slope downwardly and forwardly;

(b) an upper front wall extending upwardly from a front edge of said bottom wall panel;

(c) a pair of upper side wall panels extending upwardly from opposite side edges of said bottom wall panel and rearwardly from respective side edges of said upper front wall;

(d) a lower rear wall extending downwardly from a rear edge of said bottom wall panel;

(e) a pair of lower side wall panels extending downwardly from opposite side edges of said bottom wall panel and forwardly from respective side edges of said rear wall;

(f) said lower side wall panels each having a lower edge which forms an acute angle with said lower rear wall, so that said lower rear wall and side wall panels will maintain said device in a downwardly and forwardly sloping position;

(g) said container including, integral downwardly projecting tab means to facilitate interlocking engagement with another container or similiar device for stacking thereon.

4,708,241

SUTURE PACKAGE

Seymour Black, deceased, late of West Hartford, Conn. (by Elizabeth Black, executrix), assignor to American Cyanamid Company, Stamford, Conn.

Filed Aug. 6, 1986, Ser. No. 893,853

Int. Cl.[4] A61L 17/02

U.S. Cl. 206—63.3 **1 Claim**

1. A three part, direct dispensing, self-contained, sterile surgical suture package, the first part comprising:

a first panel;

a first flap adjacent and foldably connected to one side of said first panel;

a foam layer contained on the coordinating surfaces of said first panel and flap; and

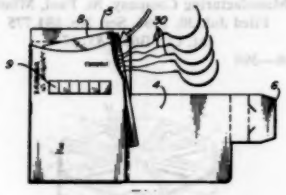
at least two surgical suture strands contained by said foam layer, one end of said strands being external to said first panel and flap, wherein the external end of each strand is needled,

the second part comprising:

a second panel;

a second flap foldably connected to one side of said second panel;

a foam receptacle contained on said second part adjacent to the external end of said strands, each strand contained by said receptacle;



a plurality of slits contained on said receptacle, the number of slits essentially equal to or greater than the number of suture strand ends external to said first panel and flap; and

at least said second flap containing means for locking said second flap to said second panel; and the third part comprising:

a strippable envelope, said package first part contained by said second part and said second part contained within said package third part.

4,708,242

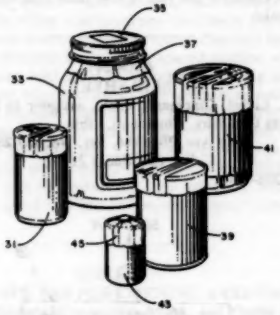
PROCESS AND APPARATUS FOR COVERING ARTICLES WITH FILM

Philip L. Reid, Rte. 2, Box 422, Duncan, S.C. 29334, and Thomas S. Lofton, Jr., 734 Cherokee Rd., Charlotte, N.C. 28207

Continuation of Ser. No. 677,188, Dec. 3, 1984, Pat. No. 4,658,568. This application Jan. 21, 1987, Ser. No. 10,292

Int. Cl.[4] B67B *5/03, 3/04*

U.S. Cl. 206—257 **1 Claim**



1. A partially covered article produced by the process of:

contacting an article to be covered with a covering film, said article having a primary surface contacted by said film and a secondary surface merging with said primary surface and being generally perpendicular thereto:

moving a portion of said film and said article relative to one another toward one another in the direction of said secondary surface;

circumferentially restraining said film in a circumference about said secondary surface whereby said film portion is positioned across said primary surface and subsequently stretched in the direction of said secondary surface due to said steps of moving and restraining; and

severing said film portion from said film by continuing said steps of moving and restraining until said film portion is severed from adjacent film, said severed film then clinging to said secondary surface due to the stretching thereof.

4,708,243

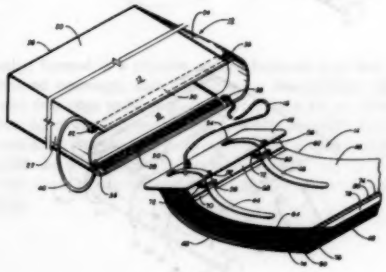
PORTABLE BAG STORAGE ASSEMBLY

Wayne M. Nailon, 3020 N. Nesbitt, Oklahoma City, Okla. 73107

Filed May 6, 1986, Ser. No. 860,050

Int. Cl.[4] B65D *30/00, 33/02, 33/14, 33/16*

U.S. Cl. 206—315.11 **7 Claims**



1. A bag assembly for storage of classifiable objects, comprising:

an outer bag formed of resilient material and having sides and bottom that define a selected volume;

a plurality of generally transparent plastic bags having opposite sides, bottom and top with the top being formed with a reclosable fastener means;

retainer means securing the bottom of each of said plurality of plastic bags; and

tether means connecting said retainer means to said outer bag to allow insertion and removal of said plurality of plastic bags relative to said outer bag.

4,708,244

FISHING LINE SPOOL HOLDER FOR A TACKLE BOX

Gerald N. Fish, 104 Surf Dr., and Joseph J. Cossuth, 44-D Woodland Ave., both of Cocoa Beach, Fla. 32931

Filed Sep. 19, 1986, Ser. No. 909,214

Int. Cl.[4] B65D *25/04, 85/04*

U.S. Cl. 206—315.11 **10 Claims**

1. In combination with a fishing tackle box, a fishing line spool holder engaged with said tackle box to facilitate the transfer of fishing line from a fishing line spool to a fishing reel, the spool holder comprising

(a) an elongated spindle on which the fishing line spool is rotatably mounted in substantially the same plane as the fishing reel;

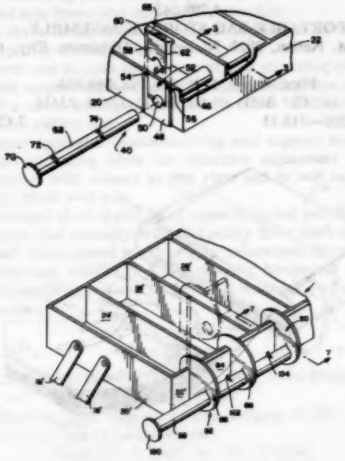
(b) a spindle holder into which the spindle is inserted, and

(c) means for removably engaging said spindle holder with the fishing tackle box;

(d) a portion of said spindle extending beyond said spindle holder and fishing tackle box a predetermined distance, whereby the fishing line spool is rotatably mounted on the spindle between one end thereof and the fishing tackle box.

9. In combination with a fishing tackle box having a tray therein including a plurality of walls forming a series of storage compartments, a fishing line spool holder engaged with the tackle box tray to facilitate the transfer of fishing line from a fishing line spool to a fishing reel, the spool holder comprising

(a) a spindle on which a fishing line spool is rotatably mounted;
(b) a support for holding said spindle;
(c) said support comprising a bar;
(d) a plurality of spaced support segments mounted on said bar;

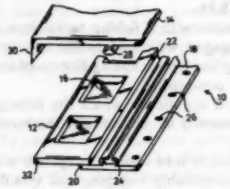


(e) each of said support segments having an opening, the openings of the segments being aligned;
(f) said spindle being inserted through the alinged openings of the support segments, and
(g) means exteriorly of the tackle box tray for engaging said support segments with the tray of the fishing tackle box.

4,708,245
CARRIER TAPE

Hugo Boeckmann, Arlington Heights, Ill.; Glenn E. Huff, Bedford, Tex., and Paul A. Tilman, New City, N.Y., assignors to Illinois Tool Works Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 913,131, Sep. 25, 1986. This application Jan. 29, 1987, Ser. No. 8,293
Int. Cl.[4] B65D *73/02*
U.S. Cl. 206—330 **14 Claims**

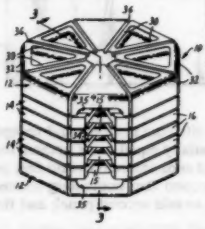


1. A carrier tape comprising:
an elongated base strip;
an elongated cover strip, substantially coextensive in length with said base strip;
a plurality of component cavities spaced longitudinally along one of said elongated strips;
at least one profile strip substantially coextensive in length with said elongated strips and containing thereon a longitudinally extending integrally formed continuous profile, said profile strip including a margin portion extending parallel to said profile, said margin being bonded to one of said elongated strips; and,
longitudinally extending continuous surfaces on the other of said elongated strips contoured to engage said profile whereby to secure said elongated strips in a releasable, continuous mechanical bond.

4,708,246
SHIPPING PACKAGE FOR RECORDING TAPE PANCAKES

Aaron A. Minion, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 30, 1986, Ser. No. 891,775
Int. Cl.[4] B65D *85/67*
U.S. Cl. 206—394 **17 Claims**

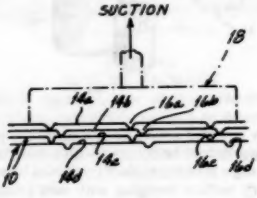


1. A package for pancakes of recording tape, each wound upon a flangeless core, said package comprising a plurality of stiff, expanded-plastic spacers, each having an outer rim and a web with flat areas against which pancakes can rest in a stack of alternating pancakes and spacers, the web terminating in an annular recess which allows the core to be of greater width than the pancake, there being means for maintaining the stack under axial compression, wherein the improvement comprises:
the base of the annular recesses of adjacent spacers in the stack are spaced greater than the width of a core,
on the base of each annular recess is at least one deformable protuberance that is spaced from a facing protuberance in the stack by less than the width of a core, and
the thickness of the rim is less than that of a web plus a pancake.

4,708,247
SLIP SHEET

Henry L. Liebel, Cincinnati, Ohio, assignor to Signode Paper Products Company, Cincinnati, Ohio

Filed Apr. 30, 1986, Ser. No. 857,256
Int. Cl.[4] B65D *21/02*
U.S. Cl. 206—501 **1 Claim**



1. A stack of paperboard slip sheets, each said sheet having a thickness up to about 0.050 inch and being permeable to the flow of air therethrough caused by suction handling equipment used to pick up individual slip sheets from said stack, each said sheet including in a surface thereof a pattern of identations and in an opposite surface thereof a pattern of protuberances, the

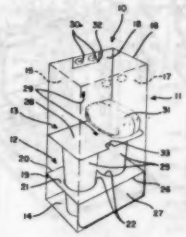
identations and protuberances in adjacent slip sheets in said stack being out of registry one with another and the depth of said indentations being such that when a suction is applied to a surface of the top sheet of the stack only the top sheets is gripped and picked up thereby.

4,708,248

COLLAPSIBLE FOOD AND BEVERAGE CONTAINER

George H. Davis, Rte. 3, Raleigh, N.C. 27603

Filed Feb. 10, 1986, Ser. No. 827,862
Int. Cl.[4] A45C *11/20*
U.S. Cl. 206—549 12 Claims



1. A container for food and beverage type products comprising: a foldable, bag-like structure including a bottom, an upstanding wall structure, and an open top; a first deployable support means disposed interiorly of said bag-like structure and including at least one aperture for receiving and supporting a beverage type container, the border of said aperture being weakened so as to frictionally engage a variety of different size beverage containers, said first support means being hingedly secured along one edge thereof to said upstanding wall structure so as to be movable between a folded position in which said first support means extends in the direction of said upstanding wall structure and a deployed position in which said first support means extends substantially parallel to said bottom of said bag-like structure; a support flap hingedly secured along an edge of said first support means for engaging said bottom of said bag-like structure when said first support means assumes a deployed position and supporting said first support means in parallel spaced relationship to said bottom of said bag-like structure when said beverage containers are inserted into said apertures; a second support means disposed interiorly of said bag-like structure above and in spaced relation with said first support means, said second support means being hingedly secured along one edge thereof to said upstanding wall structure so as to be movable between a folded position in which said second support means extends in the direction of said upstanding wall structure and a deployed position in which said second support means extends substantially parallel to said bottom of said bag-like structure; and adhesive means for holding at least one of said first and second support means in its folded position.

4,708,249

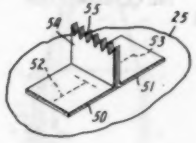
TWO PART TAPE TAB FOR OPENING A CONTAINER

Jeffrey O. Emslander, Minneapolis, Minn., and Curtis L. Larson, Hudson, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 747,976, Jun. 24, 1985, Pat. No. 4,664,263.
This application Feb. 24, 1987, Ser. No. 17,913
Int. Cl.[4] B65D *65/32*
U.S. Cl. 206—630 3 Claims

1. An easy open package for enclosing a product in a sealed flexible container, said package comprising a flexible portion having first and second openings extending through said portion in spaced relationship,

a first length of tape adhered to the flexible material and covering said first opening, a second length of tape adhered to the flexible material and covering said second opening, said tape comprising a backing having a coating of adhesive on one surface of the backing, said adhesive adhering the tape to the material surrounding the opening and each length of said tape having a free end with the free end of one length of tape adhered to the free end of the other length of tape to define together a tab with a free



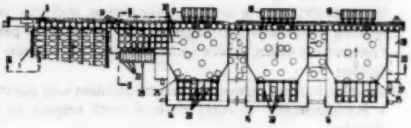
edge formed in a position spaced between said first and second openings, said tab having a discontinuity along said free edge to permit separation of the tab to afford a tearing of the lengths of tape generally centrally thereof, said tearing of the tape being along a line generally aligned with the openings in the material whereby tearing of the tape tends to cause a tearing of the material at said openings.

4,708,250

METHOD AND AN APPARATUS FOR HANDLING VULNERABLE ARTICLES, AS WELL AS A CONTAINER ADAPTED TO APPLY THIS METHOD

Jelle van der Schoot, Aalten, Netherlands, assignor to Staalkat B.V., Aalten, Netherlands

Filed Jul. 19, 1983, Ser. No. 515,269
Claims priority, application Netherlands, Jul. 23, 1982, 8202981; Jan. 26, 1983, 8300287
Int. Cl.[4] B07C *5/28;* A01K *43/08*
U.S. Cl. 209—592 20 Claims



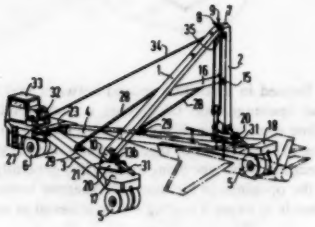
2. Apparatus for sorting articles comprising a feed belt capable of receiving a removable container, said container being capable of receiving at least of the articles, a plurality of buffer belt arranged along the length of the feed belt, a means to remove the containers from the feed belt onto one of the buffer belts, a means to remove the article from the container on the buffer belt, a conveying means to transfer the container to an inserting station, the inserting station comprising a first means to weigh the container when empty, a means to deposit an article into the container, second means to weight the container with the received article to thereby classify said article according to weight, and a means to removably attach the container to the feed belt.

4,708,251

METHOD AND APPARATUS FOR REMOVING A CRASHED AIRCRAFT

Didier Picard, and Pierre Roblin, both of Paris, France, assignors to Soudure et Mechanique Appliquees Du Val Notre-Dame, Argenteuil, France

Continuation-in-part of Ser. No. 535,311, Sep. 23, 1983, abandoned. This application Feb. 18, 1986, Ser. No. 829,865
Claims priority, application France, Apr. 26, 1983, 83 06858
Int. Cl.[4] B66C 23/26
U.S. Cl. 212—182 5 Claims



1. A crane for lifting and removing airplane wrecks, comprising in combination:

a drawbar including a pair of beams connected together at first respective longitudinal ends thereof by first hinge means for pivoting each said beam about an axis which is vertical in use;

a gantry including a pair of legs, connecting means connecting said pair of legs together at one end thereof and allowing said legs to be alternately spread apart and pulled together, said pair of legs connected at their opposite ends respectively by second hinge means to second longitudinal ends of said beams;

first, second and third sets of wheels connected to the drawbar and each set being located respectively adjacent one of said first and second hinge means, said first and second sets of wheels being provided adjacent said second hinge means, steering means located at each of said first, second and third sets of wheels for independently steering each of said sets of wheels, removable spacing means for locking said legs and said beams into respective V-shaped predetermined configurations, said legs forming at their connection a gantry apex in such a configuration, said removable spacing means being arranged when operative to permit engagement of the wreck under said gantry between said beams;

removable locking means adapted to maintain said gantry in a predetermined working position with respect to said drawbar;

hoisting means provided at said gantry apex;

a lifting jack provided between each said leg and the underlying said beam;

a platform provided above said third set of wheels;

said first hinge means being arranged between each said beam and said platform;

a cabin and a winch located on said platform and a hoisting cable connecting said winch to said hoisting means, and

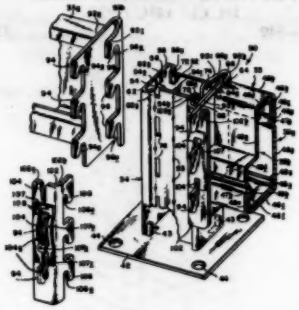
said second hinge means being arranged for pivoting said legs about a common horizontal transverse axis at least when said legs and said beams are in said predetermined V-shaped configuration from said working position to a folded-up position where said legs rest respectively upon said beams.

4,708,252

STORAGE RACK SYSTEM

Victor D. Azzi, Durham, N.H., assignor to The Kingston-Warren Corporation, Newfields, N.H.

Continuation of Ser. No. 769,994, Aug. 26, 1985, abandoned, which is a continuation of Ser. No. 562,279, Dec. 16, 1983, abandoned. This application May 20, 1986, Ser. No. 867,897
Int. Cl.[4] A47B 47/00
U.S. Cl. 211—192 21 Claims



1. A rack system comprising

A. a series of spaced-apart frame membering elongated frames each of which includes a pair of similar spaced-apart parallel columns and a series of one or more beams connected between the columns of said pair at spaced-apart locations therealong, each frame column having a front wall, a back wall, a pair of parallel side walls and fore and aft-extending flanges adjacent to each side wall, said walls and flanges together defining a completely closed box girder having longitudinal symmetry and a cross-section having the general shape of an I-beam, the opposing surfaces of the flanges on each said column diverging to define inclined planes which intersect along a line parallel to the longitudinal axis of said column, a series of longitudinally spaced-apart slots formed in the front and rear walls of each of said columns adjacent to each of the flanges on said column;

B. at least one pair of frame members extending between corresponding columns of adjacent frames at spaced-apart locations along said frames;

C. means releasably connecting the opposite ends of each frame member to a column of a said adjacent frame, each said connecting means including

1. an elongated connector mounted to a said frame member end, said connector including a first limb having a longitudinal edge, a second limb having a longitudinal edge, and a bridging portion connecting said first and second limbs, said first limb being longer than the front-to-back depth of each frame column, said second limb being shorter than said first limb and said bridging portion defining a gap between said limbs, a series of similar hooks spaced apart along said edge of said second connector limb, said connector engaging a said column so that its bridging portion wedgingly engages one of said pair of flanges at the front or rear wall of that column so that said series of hooks hook into the series of frame member engaging slots adjacent to that flange, with said first connector limb lying flush against said one column side wall, and

2. a connector lock having first and second legs oriented at an angle to one another, each said leg having an edge, a series of similar hooks spaced along said edge of said first leg, said connector lock engaging said other of said pair of flanges so that its said series of hooks hook into the series of column slots adjacent to said other of said pair of flanges and coacting means on said edge of said

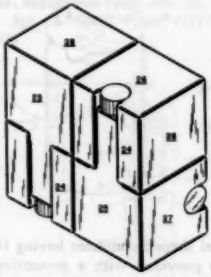
first connector limb and on said second connector lock leg which interfit so that when a load is applied to said each horizontal frame in a direction parallel to the frame columns, the associated connector and connector lock are drawn together very tightly against their respective column flanges and said connector is wedge against the column side wall between said flanges so as to develop a high degree of fixity between that horizontal frame member and the adjacent column.

4,708,253

MULTIPLE INTERCONNECTED CONTAINERS WITH ELONGATED NECKS AND TRANSVERSE RECESSES

Juris M. Mednis, Howell, N.J., assignor to Universal Symetrics Corporation, Howell, N.J.

Filed Nov. 6, 1986, Ser. No. 927,502
Int. Cl.[4] B65D *21/02*
U.S. Cl. 215—10 **12 Claims**



1. A multiple container package comprising:

a plurality of mated containers which together form and substantially fill the volume of a polyhedron having opposite sides in parallel planes;

each container having a hollow body which includes a planar polygonal front wall, a planar polygonal rear wall, a planar polygonal bottom wall, opposite planar polygonal side walls and a planar polygonal top shoulder wall, each container having an elongated recess in one of said front and rear walls, said recess extending between said side walls with a length substantially equal to a width of said body between said side walls;

each container having an elongated neck extending from its shoulder wall near its rear wall, each neck extending substantially perpendicularly to said recess in its container, at least a portion of said neck being planar with said rear wall, said elongated neck having a length which is substantially equal to the length of a recess in an adjacent container of the package; and

said plurality of containers being mated with the neck of one container extending in the recess of one other container and the shoulder wall of the one container being contiguous with one side wall of the one other container.

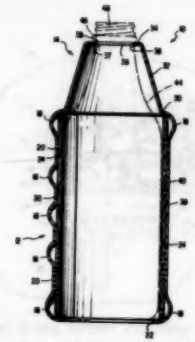
4,708,254

INSULATED BOTTLE HOLDER

James E. Byrns, 1027 2nd Ave. South, Clinton, Iowa 52732

Filed Oct. 31, 1986, Ser. No. 925,276
Int. Cl.[4] B65D *23/08*
U.S. Cl. 215—13.1 **8 Claims**

1. A thermally insulated bottle holder adapted to hold a cooled glass bottle and maintain it at a temperature below ambient, the bottle holder including a one piece shell formed from a moldable and resilient plastic material, the shell having a lower, generally cylindrical portion having an inner wall surface and an outer wall surface and a hollow upper, truncated, generally conical portion, the lower portion having a lower opening at its bottom, the upper portion terminating in a horizontal wall, an upper opening through said horizontal wall adapted to receive the upper end of a bottle, and a thermally insulating liner of generally cylindrical shape being in surface contact with the inner wall surface of the cylindrical portion, the horizontal wall portion of the truncated conical portion



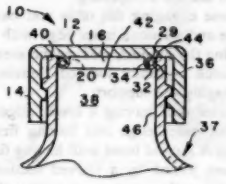
being resiliently deformable when distorted to thereby define means for receiving and holding the upper portion of a bottle, said horizontal wall portion and said liner defining the means for supporting a bottle with no structure of the holder contacting the bottom surface of the bottle.

4,708,255

CLOSURE CAP WITH A LINERLESS SEAL AND A METHOD FOR FORMING SUCH CLOSURE AND SEAL

Mortimer S. Thompson, Arlington, Mass., assignor to Tri-Tech Systems International Inc., Maumee, Ohio

Filed Dec. 12, 1985, Ser. No. 809,058
Int. Cl.[4] B65D *53/00*
U.S. Cl. 215—329 **34 Claims**



16. A linerless cap for a container comprising:

a plastic top wall, and

a plastic seal within the cap including a continuous wall defining an enclosed area having an end integral with and extending from said top wall and a lower curled compressible and resilient free end which extends away from said depending wall and upwardly toward said top wall to provide at least a U-shaped curvilinear free end which includes an arc in radial cross section to provide a curved sealing portion within said arc prior to engagement and which upon engagement is adapted to compress and seal.

4,708,256

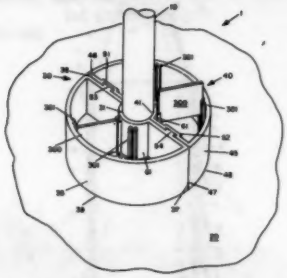
TABLE TRAY

Alfred J. Intardonato, 59 Barker Dr., Stony Brook, N.Y. 11790

Continuation of Ser. No. 707,740, Mar. 4, 1985, abandoned. This application Jul. 21, 1986, Ser. No. 885,741

Int. Cl.[4] B65D *21/02*

U.S. Cl. 220—23.4 7 Claims



1. In an article for use in combination with a vertical support such as an umbrella stand projecting through a table, the improvement comprising:

(a) first and second interlocking sections defining therebetween a closed aperture completely surrounding the support;

(b) Said first section comprising:

A first base engaging the table and having a first outer edge and a first inner edge with first means for engaging the support, said first means including a first notch centrally located therein, said first notch engaging the support; A first outer wall having a lower edge connected to the first outer edge and having first and second outer ends; A first inner wall having first and second flat sections joined by a curved section, the curved section having the same cross sectional shape as the first notch and engaging the support, said first inner wall having a lower edge connected to the first inner edge and having ends connected to the first and second outer ends of the first outer wall;

First locking means supported on the outer face of the first flat section of said first inner wall; and

second locking means supported on the outer face of the second flat section of said first inner wall;

(c) Said second section comprising:

A second base engaging the table and having a second outer edge and a second inner edge with second means for engaging the support, said second means including a second notch centrally located therein, said second notch engaging the support;

A second outer wall having a lower edge connected to said second outer edge and having first and second outer ends; A second inner wall having first and second flat sections joined by a curved section, the curved section having the same cross sectional shape of the second notch and engaging the support, said second inner wall having a lower edge connected to the second inner edge and having ends connected to the first and second outer ends of the second outer wall;

third locking means supported on the outer face of the first flat section of said second wall locking with said first locking means; and

Fourth locking means supported on the outer face of the second flat section of said second wall locking with said second engaging means;

(d) Said curved sections forming a channel trapping the support therebetween, the first and second locking means locking with the third and fourth locking means and the support located in the notches;

(e) Said first inner edge of said first base adjacent to the second inner edge of the second base;

(f) Said first and second outer ends of said first outer wall adjacent to the first and second outer ends of the second outer wall, respectively;

(g) Said first and second outer walls and said first and second bases forming a container with the support projecting therethrough and located in the notches.

4,708,257

PROTECTIVE SEAL FOR A CAN

Douglas N. Deline, 1183 W. Phillips ct., Midland, Mich. 48640

Filed Oct. 20, 1986, Ser. No. 920,688

Int. Cl.[4] B65D *51/20*

U.S. Cl. 220—257 5 Claims

1. A cylindrical shaped container having two ends at least one of which is provided with a protective sealing means comprising a thin film of a generally circular shape having a diameter substantially corresponding to the diameter of the cylindrical container, a major portion of the sealing means being removable attached so as to cover the surface of the container end and a minor portion of which is securely attached to the container, and wherein the major portion of the sealing means is adapted to coil upon itself after detachment from the container end.

4,708,258

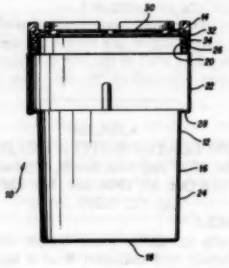
SALVAGE DRUM

Mark D. Shaw; J. Tad Heyman, and Laurence M. Bierce, all of Jacksonville, Fla., assignors to Bondico, Inc., Jacksonville, Fla.

Filed Mar. 4, 1987, Ser. No. 21,714

Int. Cl.[4] B65D *41/04*

U.S. Cl. 220—288 18 Claims



1. A salvage drum for containing hazardous wastes comprising:

a container having a side wall and a circular bottom wall, said side wall having an exterior surface, an interior sur-

face, an upper side wall portion, a lower side wall portion, and an enlarged diameter side wall portion intermediate the upper and lower side wall portions, the exterior surface of the upper side wall portion being provided with male threads, said container having an annular shoulder formed between the lower side wall portion and the enlarged diameter side wall portion; and

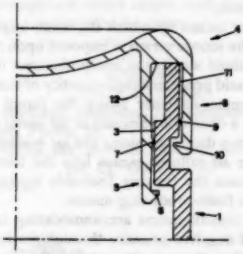
a lid having a double-walled body and a double-walled annular skirt depending from the double-walled body, said skirt having an interior circumferential surface and an exterior circumferential surface, the interior circumferential surface of said skirt being provided with female threads for mating with the male threads of said container.

4,708,259

LID AND CONTAINER FOR ACCUMULATORS

Stocchiero Olimpio, 4 Via Kennedy, 36050 Montorso Vicentino, Italy

Filed Jan. 23, 1987, Ser. No. 6,150
Claims priority, application Italy, Jan. 24, 1986, 85507 A/86
Int. Cl.[4] B65D *41/16, 41/18*
U.S. Cl. 220—306 **7 Claims**



1. A lid for accumulator container, made of plastic material and suited to be fixed on containers (1; 25) presenting at least a perimetric external impression in bas-relief, characterized by the fact that it presents two perimetric edges (5, 6; 21, 22), each of them going to contrast against the vertical walls (3, 11; 24) of the container (1; 25), and in which at least one of the edges presents a projection (7, 9; 23) forming a continuous cord tightening on the container and a cog (8, 10) hooking the impression of the container, said cog not being necessarily present on the edge itself.

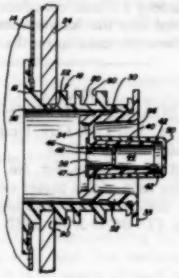
4,708,260

HYDRAULIC COUPLING COMPRISING A SEALED CLOSURE AND CONNECTION FITTING FOR A FLEXIBLE CONTAINER

Burton L. Siegal, Skokie, and Daniel J. Leshuk, Park Ridge, both of Ill., assignors to Kiwi Coders Corporation, Wheeling, Ill.

Continuation of Ser. No. 664,977, Oct. 26, 1984, abandoned. This application Feb. 28, 1986, Ser. No. 835,101
Int. Cl.[4] A47C *27/08*
U.S. Cl. 220—465 **25 Claims**

1. A make before break hydraulic coupling for a flexible container of the type having an outwardly directed tubular spout capable of storing a flowable material and comprising, in combination, a sealed closure secured to the spout and a connection fitting coupled to the closure, said fitting having means for connecting same to a hydraulic pick-up line, said sealed closure comprising a unitary generally cylindrical tubular body conforming in configuration to the spout and having opposite ends, said body having an annular flange at one end engageable with the spout and a transsverse interior wall, said transverse wall having a through passage and an elongate tube disposed within the body unitary with the transverse wall, surrounding said passage and extending parallel to the axis of said body, said tube having an inlet opening to said passage and an outlet opposite the inlet, an inwardly displacable tapered plug sealably seated within the inlet of the tube closing off said passage, said plug capable of being forced into the inlet under the fluid pressure originating interior of the container, said connector fitting being coupled to the body and including means for establishing a sealed connection with the tube with



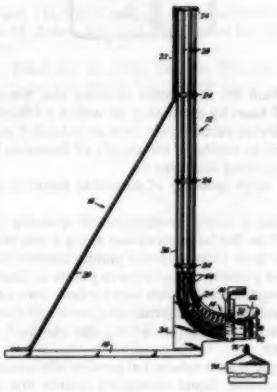
the outlet, said fitting further including a plunger engagable with said plug when said fitting is sealably engaged with said tube at said outlet and capable of dislodging the plug axially inwardly from the inlet enabling transmission of the content of the container to the hydraulic pick-up line and said fitting including means for manipulating said plunger generally axially to effect said dislodgement.

4,708,261

PACKAGING CLIP DISPENSER

Michael Sinocchi, 4 Van Gogh La., Suffern, N.Y. 10901

Filed Jan. 21, 1986, Ser. No. 820,335
Int. Cl.[4] B65G *59/06*
U.S. Cl. 221—289 **5 Claims**



1. A clip dispenser for holding and dispensing generally U-shaped resilient clips, and in combination with said clips, each clip having two legs joined by a bight portion, the end of each leg having a tang which faces the other leg, the dispenser including a vertically disposed, elongated rack of annular transverse interior cross-section, the rack holding a stack of U-shaped clips in side-to-side relation, the lower end of the rack terminating in a generally horizontal portion, the portion of the rack between the vertical and horizontal portions being in the form of a smooth curve, a downwardly opening dispens-

ing recess at the terminal end of said horizontal rack portion, the recess being of a size to dispense a single clip at a time, at least one spring-urged detent member at the extreme, forwardmost end of said horizontal rack portion, said detent member being spring urged in a direction toward the opposite end of said horizontal rack portion and abutting one wall of the forwardmost clip, the forwardmost clip being held in its position by friction between the next adjacent clip and by said spring-urged detent, whereby a closed container having a gable type top can be inserted into the forwardmost clip and be withdrawn with the forwardmost clip on the container.

4,708,262

FOAMER AND METHOD

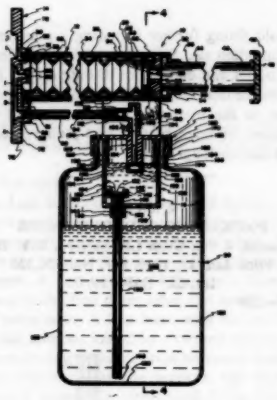
George W. Ford, Jr., Salt Lake City, Utah, assignor to Ballard Medical Products, Midvale, Utah

Filed Jul. 28, 1986, Ser. No. 890,041

The portion of the term of this patent subsequent to Jul. 30, 2002, has been disclaimed.

Int. Cl.[4] **B67D** *5/58;* **B65D** *83/00*

U.S. Cl. 222—1 **4 Claims**



1. A method for repeatedly forming and dispensing small quantities of foam by entraining air within a foamable liquid in a foaming device successively over an extended period of time without need to replenish the supply of foamable liquid in the device, comprising the steps of:

storing a large quantity of foamable liquid in a large container;

transferring a small predetermined quantity of foamable liquid from the large container along a one-way fluid flow passage to an elevated small pump chamber under force of negative pressure at successive points in time;

terminating the transferring step by flow control action after each said small predetermined quantity of foamable liquid has been accumulated within the elevated small pump chamber;

displacing at least a substantial portion of a knwon amount of the foamable liquid contained within the small pump chamber from the small pump chamber to a foam-producing site as a liquid stream under force of manually-derived positive pressure;

delivering a regulated flow of air under said force of manually-derived positive pressure to the foam-producing site;

causing a confluence at the foam-producing site by continuously merging the stream of foamable liquid and the flow of air under force of said manually-derived positive pressure to produce foam at the foam-producing site;

displacing the foam along an effluent foam flow path from the foam-producing site to a foam output site;

terminating the delivering step and the causing step, and the two displacing steps by flow control action when the known substantial portion of the small quantity of foamable liquid initially contained within the small pump chamber has been discharged from the small pump chamber to the foam-producing site.

2. A foam-dispensing device comprising:

a relatively large container for holding a supply of foamable liquid;

a relatively small elevated pump chamber for selectively receiving at successive points in time a relatively small definitive amount of said foamable liquid from the large container under force of negative pressure along first flow path means comprising suction tube means and one-way flow control means;

foam-producing means juxtaposed the large container and the pump chamber, the foam-producing means defining a juncture between (a) foam effluent means, (b) foamable liquid influent means and (c) air influend means;

source means by which pressure is obtained;

liquid passageway means by which a predetermined quantity of foamable liquid from the small pump chamber is selectively delivered to the foam-producing means at the liquid influent means;

air passageway means by which the force of positive pressure from the source means is imposed upon the foamable liquid contained within the pump chamber thereby forcing flow of said predetermined quantity of foamable liquid from the pump chamber along the liquid passageway means with a controlled amount of air under said positive pressure being displaced along the air passageway means through the air influent means into the foam-producing means to foam the flowing foamable liquid as it passes through the foam-producing means;

second flow control means accommodating imposition of the force of negative pressure through the interior of the pump chamber, through the one-way flow control means and through the interior of the suction tube means to draw another definitive amount of foamable liquid from the large container up the suction tube means, across the one-way flow control means and into the pump chamber to recharge the pump chamber with foamable liquid;

the second flow control means terminating each said displacement of foamable liquid into the elevated pump chamber when the definitive amount of foamable liquid has been so displaced to the pump chamber.

4,708,263

OUTLET NIPPLE FOR DISPENSERS OF BEVERAGE CONCENTRATES

Josephus N. le Granse, Nieuwegein, Netherlands, assignor to Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V., Utrecht, Netherlands

Continuation of Ser. No. 793,466, Oct. 30, 1985, abandoned, which is a continuation of Ser. No. 522,217, Aug. 11, 1983, abandoned. This application Nov. 24, 1986, Ser. No. 933,921

Claims priority, application Netherlands, Aug. 12, 1982, 8203177

Int. Cl.[4] **B67D** *1/08;* **F16K** *23/00*

U.S. Cl. 222—1 **1 Claim**

1. A method of dispensing coffee concentrate and preventing the drying-up effects of the coffee concentrate in a beverage dispensing machine comprising the steps of:

metering out by gravity flow a first quantity of said concentrate through an outlet nipple having a first cylindrically bore portion whose bore diameter determines the outflow rate of the concentrate and ranges from 1.5 to 4 mm, and a second portion with an upper end adjoining the lower end of said first portion and having the same bore diameter as said first portion, said second portion having a lower end with a bore diameter larger than the bore diameter of the first portion and joined with its upper end such that the second portion internally has the shape of a truncated

cone with an apex angle of 40° to 100°, the height of said first bore portion being short relative to the height of the second portion, said second portion retaining a quantity of said concentrate therein such that said first portion is left substantially free from interfering drying up effects of

ambient air following dispensing of concentrate from the outlet nipple and

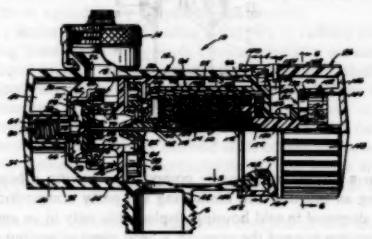
successively dispensing metered quantities of said concentrate through said outlet nipple, with each metered quantity being substantially the same.

4,708,264

WATER TIMER

Kenneth J. Bruninga, Mapleton, Ill., assignor to L. R. Nelson Corporation, Peoria, Ill.

Filed Jun. 28, 1985, Ser. No. 749,903
Int. Cl.⁴ G01F *11/30*
U.S. Cl. 222—20 **20 Claims**



1. A water timer comprising

a housing assembly,

a female hose coupling on said housing assembly for connection with a sillcock outlet or the like, to provide an inlet for the communication of a source of water under pressure to the interior of said housing assembly,

an outlet on said housing assembly,

valve means mounted within said housing assembly between said inlet and said outlet for movement between water shut off and water flow positions,

a timer dial mounted on said housing assembly (1) for manual axial movement in one direction from a water shut-off position into a water flow position (2) for manual rotational movement in one direction into a selected position of rotational adjustment which corresponds with the desired water flow time (3) for rotational movement in the opposite direction and (4) for axial movement in an opposite direction back into said water shut-off position,

an impeller within said housing assembly mounted to be rotated by impingement of water flowing between said inlet and outlet when said valve means is in said water flow position,

a speed reducing motion transmitting mechanism between said impeller and said dial for slowly imparting a rotational movement in said opposite direction to said dial in response to the rotational movement of said impeller after said dial has been manually axially moved into said water flow position and rotated in said one rotational direction into a selected position,

said valve means including a valve seat in said housing assembly and a valve member movable in one direction, corresponding with the one direction of axial movement of said dial, into a water flow position out of engagement with said valve seat and movable in an opposite direction, corresponding with the opposite direction of axial movement of said dial, into engagement with said valve seat into a water shut-off position,

said valve member having a first pressure responsive surface area facing in said opposite direction disposed in communication with water under pressure communicating with said inlet and a second pressure responsive surface area facing in said one direction,

means defining a controllable water pressure chamber within said housing assembly communicating with said second surface area,

first passage means for communicating water under pressure communicating with said first surface area when said valve member is in its water shut-off position with said controllable chamber,

means including the relative sizes of said first and second pressure responsive surface areas for biasing said valve member into its water shut-off position when said dial is in its water shut-off position and a source of water under pressure is communicated with said inlet,

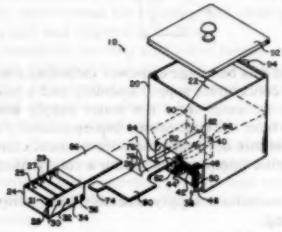
and means operable in response to the axial movement of said dial in said one direction into said water flow position for communicating said chamber with said outlet thereby changing said biasing means to an extent sufficient to cause the same to bias said valve member from its water shut-off to its water flow position.

4,708,265

SYSTEM FOR AUTOMATIC MEASURING AND DISPENSING OF GRAIN AND POWDER FOOD PRODUCTS

John H. Bopst, III, 409 Chalfonte Dr., Baltimore, Md. 21228, and Joyce M. Zakro, 435 Woodstone West Dr. NE., Marietta, Ga. 30067

Filed Jul. 23, 1986, Ser. No. 888,356
Int. Cl.⁴ B67D *5/22*; G01F *11/10*
U.S. Cl. 222—43 **7 Claims**



1. In a system for dispensing finely divided material and having structure defining:

a housing,

a chute in the housing for containing finely divided material, the chute opening into a recess below the chute,

a drawer in the recess for receiving finely divided material from the chute and slidable from a position in the recess to a selectable plurality of positions of partial outward extension from the recess, each position corresponding to a selectable quantity of finely divided material,

the drawer having open top and open bottom and a series a

vertically fixed members dividing the drawer into a plurality of compartments defining said selectable quantities,

an upper slide protruding rearwardly from an upper portion of the drawer for preventing finely divided material from the chute from falling behind the drawer in said recess, and

means for selecting any one of said selectable plurality of positions of partial extension of said drawer; the improvement comprising;

a lower slide beneath the drawer and having structure proportioned for use in pulling the lower slide outward in the recess and thereby extending the drawer to said selected one of said plurality of positions without spillage of said finely divided material, said structure including the lower slide having means for engaging the drawer and forcing the drawer outward with the lower slide to said position when the lower slide is pulled outward and for thereupon permitting the lower slide to be pushed rearwardly into said recess free of the drawer for releasing a said quantity of finely divided material through said drawer open bottom, the means for selecting defining a series of features spaced apart in height and distance along the drawer, an index on the housing, and means for pre-setting the index relative to any selected feature of said series of features for engagement with said feature on sliding of the drawer to a said selected position, and for preventing the drawer from moving rearward into the recess when said lower slide is pushed rearwardly.

4,708,266

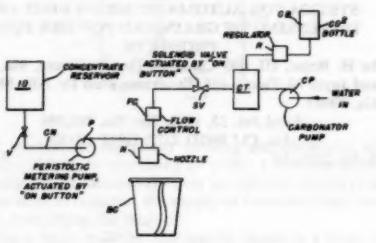
CONCENTRATE DISPENSING SYSTEM FOR A POST-MIX BEVERAGE DISPENSER

Arthur G. Rudick, Marietta, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.

Filed Mar. 21, 1986, Ser. No. 842,287

Int. Cl.[4] B65D *35/56*

U.S. Cl. 222—105 **7 Claims**



1. In a post-mix beverage dispenser including a water supply assembly, a concentrate supply assembly and a mixing assembly for mixing water from the water supply assembly and concentrate from the concentrate supply assembly together to form the post-mix beverage, the improvement comprising:

(a) peristoltic pump means having a rotary pumping member;

(b) the concentrate supply assembly being disposable and including,

1. a disposable concentrate container; and

2. disposable flexible conduit means connecting said concentrate container to said mixing assembly and being disposed in operative engagement with said rotary pump member to cause concentrate in the container to be pumped through the conduit means to the mixing assembly;

wherein the concentrate container has an external surface portion with a complementary shape to an external surface of the rotary member of the peristoltic pump, and the conduit means is operatively engaged between said surface portion and said external surface, said container including a rigid outer shell, a portion of which forms said surface portion, and a sealed collapsible bag within said rigid outer shell, said bag having a discharge opening in fluid communication with said conduit means through a valve means, said surface portion with the complementary shape being disposed on a bottom wall of the rigid shell and said valve means is disposed in said bottom wall adjacent said surface portion with an actuator stem extending from said bottom into contact with a stationary support surface, whereby the weight of said container causes the support surface to depress said stem to open said valve means when said surface portion with said complementary shape operatively engages the conduit means.

4,708,267

DISPENSER FOR PASTY COMPOSITIONS

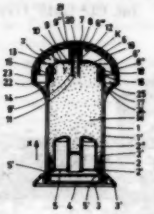
Werner Sieverding; Herbert Mettenbrink; Günter Pohlmann, and Ludger Hackmann, all of Lohne, Fed. Rep. of Germany, assignors to Bramlage Gesellschaft mit beschränkter Haftung, Lohne, Fed. Rep. of Germany

Filed Apr. 24, 1985, Ser. No. 726,580

Claims priority, application Fed. Rep. of Germany, May 9, 1984, 3416999

Int. Cl.[4] B65D *37/00*

U.S. Cl. 222—211 **9 Claims**



1. In a dispenser for pasty composition having a housing forming an opening and containing the pasty composition, a piston disposed in said housing displaceable only in an emptying direction toward the opening, a head piece extending over the opening of the housing and operatively connected to said housing, the head piece comprising a movable wall, an outer actuating handle operatively connected to the wall of said head piece, the wall being pressable inwardly in a direction towards the piston by pressing on said outer actuating handle, a tube having a dispenser outlet opening at an outer end of the tube, the tube being connected to the wall of the head piece for movement therewith and having an end section which forms an inner open mouth end through which the pasty composition enters, said end section with its entire length projecting inwardly beyond the wall extending into the pasty composition, the improvement comprising

a collar which projects outwardly beyond the wall, is concentric to the tube and is operatively coupled to the tube for movement therewith,

the actuating handle is formed as a dome-shaped cap constituting an applicator head for the pasty composition, is operatively coupled to the collar for movement therewith and thereby connected to said tube via said collar,

said housing is formed with an annular wall which extends outside of and is spaced from an edge of the cap, and

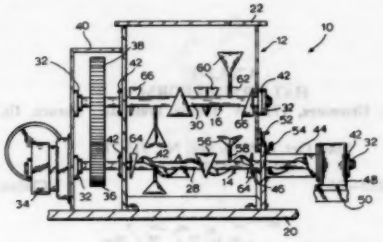
a closure lid having a stopper, said stopper extends into the dispenser outlet opening, said closure lid is spaced from the cap and is removably held against said annular wall of the housing.

4,708,268

METHOD AND APPARATUS FOR THE ACCURATE VOLUMETRIC FEEDING OF MATERIALS

William O. Wurtz, Paramus, N.J., assignor to Willow Technology, Inc., Paramus, N.J.

Filed Dec. 6, 1984, Ser. No. 678,894
Int. Cl.[4] G01F 11/20
U.S. Cl. 222—238 7 Claims



1. Apparatus for accurate volumetric feeding of materials which require agitation to induce flow, such as material which is slightly cohesive, of non-uniform particle size and shape, of non-uniform density, or damp material which is otherwise free flowing, said apparatus comprising:

(a) a hopper for containing said materials including a lower horizontally disposed, cylindrically shaped trough portion intersecting an upper horizontally disposed cylindirically shaped trough portion;

(b) an adjustable feed opening in said hopper for feeding said material from said hopper disposed at a first end of said lower cylindrically shaped trough portion;

(c) a feeder assembly including a plurality of radially extending material working tools circumferentially mounted at equal angular displacements along a rotatable shaft and feed helix longitudinally mounted on said shaft to direct material to said feed opening in said first end of said trough portion, said working tools extending radially beyond said feed helix and said shaft of said feeder assembly being disposed longitudinally in said lower trough portion and defining the center of the cylindrical shape thereof,

each of said material working tools comprising two substantially triangularly shaped sides converging toward each other at their conection to the shaft and converging toward each other to define a forward edge in the direction of rotation of said tool thereby defining a double edge shape, a bottom face recessed from the bottom edges of said sides and disposed so as to be adjacent to and substantially parallel to the internal surface of said cylindrically shaped lower trough portion;

(d) an agitator assembly longitudinally disposed in said upper trough portion and comprising a plurality of radially extending material working tools circumferentially mounted at equal angular displacements along a rotatable shaft disposed parallel to the rotatble shaft of said feeder assembly, and defining the center of the cylindrical shape thereof;

said material working tools being configured identically to the material working tools of the feeder assembly, the bottom faces of said material working tools moving in proximity to and substantially parallel to the internal surface of said upper cylindrically shaped trough portion, the tools of said feeder and agitator assemblies being mounted to their respective shaft so that the paths of travel of the tools of one shaft overlap the paths of travel of the tools of the other shaft so as to create an overlapping zone of interaction between the respective tools of said shafts, the material working tools of said agitator assembly being arranged on their respective shaft in a corresponding manner to the arrangement of the material working tools of said feeder assembly; and

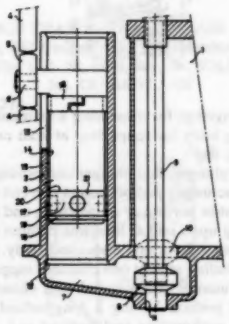
(e) means for rotating said shafts of said feeder and agitator assemblies counter to one another so as to fluidize the material in said hopper and establish a uniform bulk density throughout by the action of said material working tools and move said fluidized material to said feed opening by the action of said rotating helix.

4,708,269

PLUNGER-OPERATED DISPENSING DEVICE

J. Willerding, Driebergen, Netherlands, assignor to Stork Bepak B.V., Utrecht, Netherlands

Filed Jul. 7, 1986, Ser. No. 882,361
Claims priority, application Netherlands, Jul. 10, 1985, 8501983
Int. Cl.[4] B67D 5/40
U.S. Cl. 222—377 4 Claims



1. A plunger-operated dispensing device for liquids which comprises

a stock container for the liquid to be dispensed, said stock container having a feed opening,

a substantially vertically oriented dispensing cylinder positioned adjacent said stock container, said dispensing cylinder including an inner surface having an inside diameter,

channel means connecting a lower end of said dispensing cylinder with said feed opening of said stock cylinder and defining a dispensing channel,

a movable valve means for opening and closing said feed opening and said dispensing channel,

operating means for moving said valve means,

a dispensing plunger which is axially movable within said dispensing cylinder between upper and lower end positions, said dispensing plunger having upper and lower ends and defining outside diameter which is smaller than said inside diameter of the inner surface of said dispensing cylinder, thereby leaving a space therebetween,

sealing means on said dispensing plunger near the lower end thereof for sealing against the inside wall of said dispensing cylinder,

a first guide means on said dispensing plunger near the lower end thereof for guiding said dispensing plunger within said dispensing cylinder, said first guide means being located above said sealing means,

a second guide means on said dispensing plunger near the upper end thereof for guiding said dispensing plunger within said dispensing cylinder,

control means for controlling the movement of said dispensing plunger within said dispensing cylinder, and

adjustment means for moving said dispensing plunger downwardly past the lower end position thereof and such that the sealing means thereof will be positioned below the lower end of the dispensing cylinder.

4,708,270

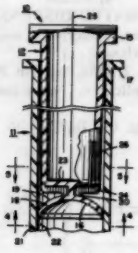
DRIPLESS SYRINGE

Merlin R. Ruesch, Chagrin Falls, Ohio, assignor to Loctite Corporation, Newington, Conn.

Continuation of Ser. No. 720,476, Apr. 8, 1985, abandoned, which is a continuation of Ser. No. 475,880, Mar. 16, 1983, abandoned. This application May 16, 1986, Ser. No. 866,986

Int. Cl.[4] B67D 5/42

U.S. Cl. 222—386.5 **1 Claim**



1. In a no-drip syringe for dispensing a material comprising:

(a) a dispensing body for supporting at least one column of said material; and

(b) at least one plunger, said plunger comprising an elongate member, an actuating pad portion at one end of said member, and a piston portion at an opposing end of said member for acting upon said at least one column of said material to dispense it from said dispensing body, said dispensing body including at least one chamber supporting said at least one column of said material, said chamber comprising a barrel portion having a longitudinally extending internal wall surrounding said material and, wherein said member is arranged to slide loosely within said barrel portion and said piston portion is arranged to move within said barrel in generally sealing engagement with said internal wall, said member comprising a central longitudinally extending core having a plurality of longitudinal flanges extending radially outwardly from said core with the radial extent of said flanges being selected so that said member is adapted to loosely slide within said barrel portion;

(c) no-drip means for substantially stopping the dispensing of said material when said at least one plunger is not being actuated to dispense said material; said no-drip means comprising:

(d) said piston portion having a preferred generally hemispherical shape with a concave hollow unobstructed face for acting on said material, said piston portion being resilient and including a convex face opposing said concave face and wherein said connecting portion is connected to a central portion of said convex face;

(e) means for deforming said piston portion from said preferred shape during a dispensing operation and for allowing said piston portion to return to its preferred shape after said dispensing operation is stopped, said deforming means comprising a centrally located portion of said plunger connecting said piston portion to said member, said connecting portion having a radial extent which is substantially smaller than the radial extent of said flanges;

(f) said elongate member, said pad portion, said connecting portion, and said piston portion comprising a unitary member and

(g) means resistant to chemical attack by said material supported by said piston portion, said last mentioned means comprising a grommet supported by said piston portion, said grommet cooperating with said hemispheric face of said piston portion so as not to interfere with the no-drip operation of said syringe, said grommet having a concave portion generally conforming to the concave face of said piston portion.

4,708,271

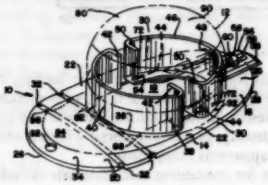
HAT DRYING FORM

Robert J. Grommes, 1710 W. Indian Trail Rd., Aurora, Ill. 60506

Filed Oct. 6, 1986, Ser. No. 915,773

Int. Cl.[4] A42C 1/04

U.S. Cl. 223—25 **7 Claims**



1. A form particulary adapted to hold a hat or cap during drying of such, said form comprising:

a base defined by a support plate formed with an inner opening to divide said support plate into a front and a rear area connected by spaced apart side areas,

a stationary member attached to said support plate and including a semicircular shaped, upright flange portion positioned adjacent to a forward edge of said opening,

a movable member slideably attached to said support plate, said movable member including a semicircular shaped, upright flange portion positioned in an opposing manner to said stationary member flange portion to partially surround said inner opening, and a slide bar attached to said movable member flange portion and extending over said rear area of said support plate, and

fastening means connecting said support plate and said movable member to allow selective regulation of a position of said movable member flange portion with respect to said stationary member flange portion,

said form further including,

a pair of spaced apart slots formed respectively in said support plate side areas,

an elongated slot formed in said movable member slide bar, and

said fastening means comprising a set of fasteners carried respectively by said movable member and said support plate and disposed in said slots to allow said movable member to be slideably positioned with respect to said base,

wherein said hat or cap in a wet condition may be placed on said form with said flange portions extending into a head piece thereof and a bill thereof extending over said support plate front area, a position of said movable member may be adjusted to produce a snug fit between an inner head band of said head piece and said flange portions and apply a tensioning force to material forming said head band and to a connection between said head piece and said bill, and elastic members may be placed around said bill and said support plate front area to hold said bill against said area with said hat or cap then air drying in a shrink, wrinkle and wrap resistant manner.

4,708,272

APPARATUS AND METHOD FOR INSERTING A FOOT INTO A BOOT

Romeo E. Guerra, 6118 Walnut La., Dallas, Tex. 75243

Filed May 5, 1986, Ser. No. 859,378
Int. Cl.[4] A43B 11/00
U.S. Cl. 223—113 8 Claims

1. An apparatus for facilitating insertion of a foot into a boot, comprising:

a sleeve formed of a thin, flexible material, having an open top for insertion of the foot into the sleeve, the sleeve reducing friction as the sleeve-enclosed foot is inserted into the boot;

the sleeve having tear line means extending along its length for causing the sleeve to tear apart longitudinally when the upper portion of the sleeve on opposite sides of the tear line means is pulled in opposite directions by the user, to pull the sleeve from the boot after the foot is inserted into the boot; and

the sleeve being of smaller diameter at the bottom than at the top, and having a heel portion extending upwardly from the bottom at an inclined angle relative to the top for receiving the heel of the user.

4,708,273

CONTAINER HOLDER

Brian T. Grant, 1282 E. 48th St., Los Angeles, Calif. 90011

Continuation of Ser. No. 712,588, Mar. 15, 1985, abandoned.
This application Aug. 12, 1986, Ser. No. 896,308
Int. Cl.[4] A45F 5/00
U.S. Cl. 224—252 1 Claim

1. A device for carrying on a person's belt a fragile, disposable cup having walls tapered from an upper end of a first preselected diameter to a lower end of a smaller second preselected diameter, said device being a one-piece molded structure comprising:

a retaining portion defining an aperture for reception of the cup in a downward direction to a preselected operative position, the retaining portion comprising a substantially rigid ring which has a diameter at least as great as the first preselected diameter and extends around the upper end of the cup when the cup is in said operative position;

stem portion having one end connected to said ring;

a stop portion connected to the opposite end of said stem portion and carried below the retaining portion and engageable with the lower end of the cup to support its weight when the cup is in said operative position;

a pair of opposed resilient arms the stem portion and curved to define an opening in alignment with said aperture and having a diameter at least as great as the second preselected diameter before the cup is placed in said operative position;

the arms being actuable outwardly by the walls of the cup as the cup is moved downwardly to said operative position, so that the arms press inwardly against the walls of the cup to receive the cup snugly in said operative position; and

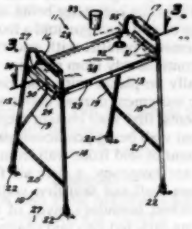
means for attaching the device to a belt of a user without removing said belt comprising a tab portion in alignment with said stem portion extending substantially rearwardly and downwardly from a preselected location on the ring to define a downwardly opening slot for reception of the belt.

4,708,274

REMOVABLE TRAY APPARATUS FOR A WALKER

Cyril J. Roche, 567 Corbett Ave., San Francisco, Calif. 94114

Filed Oct. 28, 1986, Ser. No. 924,062
Int. Cl.[4] A61H 3/00
U.S. Cl. 224—273 4 Claims



1. An apparatus in combination with a walker of a type including four substantially vertically disposed legs adapted to contact the floor at the bottom thereof, brace means for interconnecting the four legs together, handle means connected to respective ones of said legs, one each side of the top of the walker for permitting a user to grasp one of said handle means with each hand, a first horizontal elongated member disposed below one of said handle means and extending from one of said legs toward another of said legs, and a second horizontal elongated member disposed below the other of said handle means and extending parallel to said first horizontal member and toward another of said legs, said apparatus consisting of:

a generally rectangular rigid tray means for extending over and above said first and second horizontal elongated member;

each side of said tray means having first and second downwardly extending elongated flange means extending on the outside of respective ones of said first and second horizontal elongated members for preventing said rigid tray means from falling off said first and second horizontal elongated members;

a third downwardly depending elongated flange means attached to said rigid tray means and extending parallel and adjacent to but spaced from said first downwardly extending flange, said third flange being disposed between said first and second horizontal elongated members but closer to the first than to the second horizontal elongated member; and,

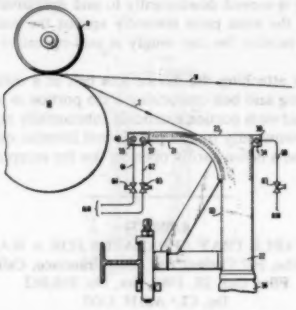
said downwardly depending flange means permitting said rigid tray means to be easily and quickly removed from or placed on said first and second horizontal elongated members.

4,708,275

TRIM RECEIVER

John P. Farrell, Paducah, Ky., assignor to Westvaco Corporation, New York, N.Y.

Filed Jul. 23, 1986, Ser. No. 888,135
Int. Cl.[4] B65H 23/00
U.S. Cl. 226—97 6 Claims



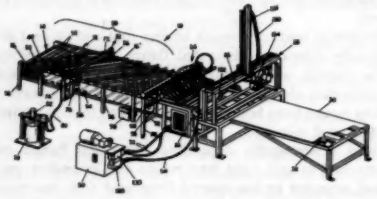
1. A trim disposal duct receiver having an axially extending duct portion extending longitudinally from a planar rim perimeter, the plane of said rim perimeter being substantially perpendicular to the axis of said duct portion, a front wall of said duct having planar elements parallel with said rim plane, said front wall extending continuously from said rim along an increment that is substantially co-planar with said rim plane into a substantially 90° arc increment curved about an axis parallel with said planar elements, first wall curtain means substantially the width of said front wall being positioned parallel with said rim co-planar increment of said front wall from said rim to beyond a first point of arc tangency, a first air flow channel space between said front wall and said first wall curtain means for directing an attached boundary layer of air over said front wall, such air being directed into said channel space from a first air distribution manifold at said rim.

4,708,276

AUTOMATIC LATTICE FABRICATION APPARATUS

Wayne M. Knoth, Belmont, and Dennis O. Corbin, Caledonia, both of Mich., assignors to Universal Forest Products, Grand Rapids, Mich.

Continuation of Ser. No. 623,975, Jun. 25, 1984, Pat. No. 4,562,949. This application Jan. 6, 1986, Ser. No. 816,282
The portion of the term of this patent subsequent to Jan. 7, 2003, has been disclaimed.
Int. Cl.[4] B27F 7/17
U.S. Cl. 227—7 15 Claims



1. Lattice fabrication apparatus for forming lattice strips comprising:

an elongated frame;

an elongated conveyor positioned on the frame and having a generally horizontal conveying surface thereon, the conveyor having positioning means thereof for positioning the lattice strips in their desired overlapping position, the conveyor having a lattice lay-up portion at an upstream position of the conveyor;

automatic stapling apparatus positioned downstream of the lay-up portion, the stapling apparatus comprising a series of staple guns mounted across the conveyor so as to be in alignment with the overlapping portions of the lattice as they pass by the staple guns;

longitudinally oriented powered rip saws positioned downstream of the stapling apparatus on the sides of the frame that trim excess lattice from the sides of the lattice;

a cross-cut saw mechanism positioned downstream of the stapling apparatus and aligned for receipt of stapled lattice, said cross-cut saw mechanism ordinarily permitting the lattice to pass unimpeded therethrough but being activated to cut off a section of lattice when the section of lattice passing through the cross-cut saw mechanism reaches a predetermined length, the cross-cut saw mechanism thereafter becoming deactivated and permitting resumption of unimpeded transfer of lattice through the apparatus; and

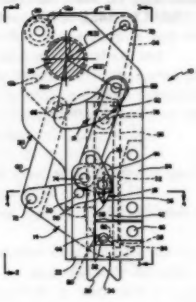
control means for sensing lattice position and automatically actuating the staple guns when the overlapping lattice strips are properly positioned adjacent the guns, the control means sensing lattice section length and automatically actuating the cross-cut saw mechanism to cut off the lattice when each section reaches a predetermined length, the control means actuating the cross-cut saw and moving the cross-cut saw into engagement with the lattice to cut the lattice at said predetermined length and thereafter moving the cross-cut saw out ot engagement with the lattice.

4,708,277

STITCHING HEAD

James R. Schlough, Morrisonville, N.Y., assignor to AM International Incorporated, Chicago, Ill.

Filed Nov. 28, 1986, Ser. No. 935,747
Int. Cl.[4] B27F 7/28, 7/30
U.S. Cl. 227—88 32 Claims



1. A stitching head comprising:

a crank rotatable about an axis through a predetermined oscillatory displacement;

first movable means for receiving and supporting an elongated piece of wire;

second movable means cooperable with said first movable means for forming the piece of wire into a staple;

third movable means cooperable with said first and second movable means for guiding and driving the staple into a product; and

motion transmitting means separately coupling said crank with said first, second and third movable means for causing independent and coordinated movement thereof in

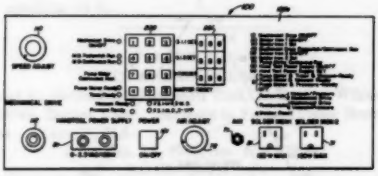
response to crank rotation to form the piece of wire into the staple and drive the staple into the product.

4,708,278

PORTABLE, ELECTRONICALLY CONTROLLED, INTEGRATED, P.C.B. REWORK STATION

Gerald D. Opfer, Lakeside, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 10, 1986, Ser. No. 829,871
Int. Cl.[4] B32K *3/00*
U.S. Cl. 228—20 7 Claims



1. A self-contained, electronic electromechanical work center for servicing printed circuit boards comprising:
means for adjusting solder iron temperatures;
means for varying a pressure differential;
means for providing mechanical rotary drive power;
means for applying low voltage hand tool power;
means for providing an auxiliary controlled power outlet;
an alternate foot switch control unit for selectively coupling to the low voltage hand tool power supplying means, the mechanical rotary drive power providing means and the varying pressure differential means;
means for digitally controlling the function selection of the portable work center mounted on a front panel thereof;
means for preventing operation of the varying pressure differential means whenever the low voltage hand tool power supplying means is on; and
means for preventing operation of the foot switch unless the pump motor is running and being operatively coupled therewith.

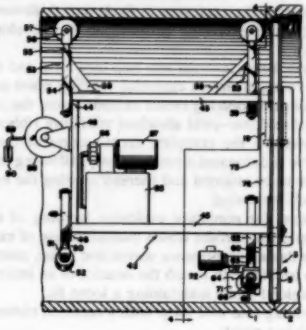
4,708,279

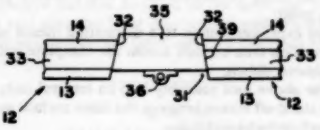
INTERNAL ALIGNMENT CLAMP

Timothy C. Dearman, 3002 S. Main St., P.O. Box 937, Pearland, Tex. 77588

Filed May 14, 1984, Ser. No. 610,199
Int. Cl.[4] B23K *37/04*
U.S. Cl. 228—49.3 11 Claims

1. In an internal alignment clamp having a body, a pair of arms mounted on the body for movements between radially extended and retracted positions, and means reacting between said body and said arms for moving the latter, said arms and said body together forming a generally cylindrical member whose diameter is variable in response to movement of said arms, said arms having confronting ends between which exists a gap when said arms are in extended positions, the improvement wherein the confronting ends of said limbs taper in a direction along the longitudinal axis of said cylindrical member from one side of said cylindrical member toward the other, and an insert movable in said direction into said gap to bridge the latter, said insert having an arcuate outer surface formed on a radius corresponding substantially to that of said cylindrical member, said insert having its ends tapered to conform to the taper of said free ends of said limbs, means for removably





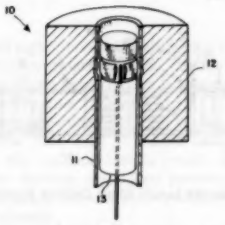
supporting said insert in said gap, and means for adjusting said insert diametrally of said member.

4,708,280

TOOL AND PROCESS FOR MINIATURE EXPLOSIVE JOINING OF TUBES

Laurence J. Bement, Newport News, and James W. Bailey, Tabb, both of Va., assignors to The United States of America as represented by the Administrator, National Aeronautics & Space Administration, Washington, D.C.

Continuation-in-part of Ser. No. 790,597, Oct. 23, 1985. This application Sep. 8, 1986, Ser. No. 904,812
Int. Cl.[4] B23K *20/08*
U.S. Cl. 228—107 5 Claims



1. A joining tool for miniaturized explosive welding of an inner surface to an outer surface comprising:
an elongated tool form;
a low-yield sheathed miniature ribbon explosive; and
an initiator;
said tool form having a recessed ribbon explosive holding point for receiving the low-yield ribbon explosive and an initiator end suitable for receiving a detonating means, and shaped so as to maintain contact between the ribbon explosive and a surface to be welded;
said low-yield sheathed miniature ribbon explosive being

disposed so as to match the area of said surface and the external dimension formed by the recessed ribbon explosive holding point and being uniformly distributed in said ribbon explosive holding point whereby thin concentrations causing the explosion to fizzle and thick concentrations causing excessive pressure to be developed are avoided;

said initiator being inserted into said tool form and received at said recessed ribbon explosive holding point such that the initiator detonating means extends across the complete width of said low-yield sheathed miniature ribbon explosive, whereby the complete cross-section of the ribbon explosive is detonated simultaneously, allowing minimum pressure to be attained and thereby causing the explosion to be self-sustaining.

5. A process for miniature explosive welding of an inner surface to an outer surface which minimizes use of explosives and reduces damaging pressure waves and noise, comprising:

shaping a tool form to match the interior of an inner surface to be welded while maintaining a loose fit;

circumscribing said tool form with a recessed ribbon explosive holding point;

forming a low-yield sheathed miniature ribbon explosive around the outer circumference of said ribbon explosive holding point;

mating said explosive ribbon to a detonating means so that the detonation area extends across the complete width of the explosive ribbon;

forming the above tool assembly into an integral unit;

providing stand off means between the inner surface and the outer surface to be welded;

positioning the inner surface to be welded inside an outer surface;

inserting said tool assembly into said inner surface to be welded and positioning the tool assembly so as to center the explosives over the stand off means; and

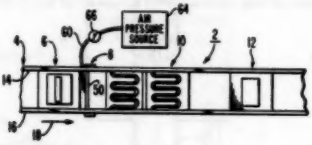
initiating the low-yield ribbon explosive with the detonating means to effect a joint.

4,708,281

APPARATUS AND METHOD FOR APPLYING SOLDER FLUX TO A PRINTED CIRCUIT BOARD

Leonard Nelson, Cherry Hill, and Anthony J. Barresi, Hammonton, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Feb. 16, 1982, Ser. No. 348,692
Int. Cl.[4] H05K *3/34*; B23K *1/20*
U.S. Cl. 228—180.1 **14 Claims**



1. A printed circuit board foam fluxing apparatus comprising:

means for passing an apertured printed circuit board through a standing wave of foamed flux to coat a surface of the board with the flux; and

means for blowing a stream of air across said board against said coated surface, said stream having a relative position, velocity, orientation and shape such as to remove a portion of the flux on said coated surface and to leave on said surface a relatively thin film of the flux, and such as to blow a portion of said flux into the apertures in said board.

3. A method of fluxing an apertured printed circuit board comprising:

passing the printed circuit board through a standing wave of foamed flux, and then;

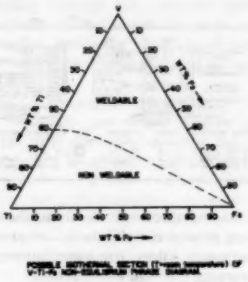
blowing away excess flux deposited on a surface of said passing board and blowing a portion of the flux into apertures in said board and around component leads which may be in said apertures in said board to form a relatively uniform coating of flux on said surface and in said apertures.

4,708,282

WELDING ALLOY AND METHOD OF MAKING AND USING THE SAME

John L. Johnsen, Portland; William E. Wood, Hillsboro; Jack H. Devletian, Portland, all of Oreg., and Donald G. Spring, San Pedro, Calif., assignors to Huck Manufacturing Company, Southfield, Mich.

Filed Oct. 15, 1985, Ser. No. 787,299
Int. Cl.[4] B23K *35/32*
U.S. Cl. 228—263.16 **11 Claims**



9. In a method of welding a titanium member to an iron member, the improvement comprising the step of:

providing at least during the welding process itself a welding alloy consisting of a vanadium metal and at least one other metal taken from the group consisting of titanium and iron,

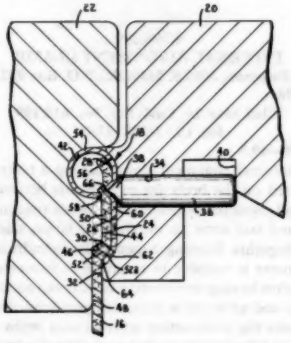
whereby said alloy will substantially preclude the formation of brittle intermetallic compounds.

4,708,283

REINFORCING RING CONSTRUCTION FOR CONTAINERS

Michael J. Brazil, Parkville, Mo., assignor to Sealright Co., Inc., Kansas City, Mo.

Filed Feb. 5, 1986, Ser. No. 826,382
Int. Cl.[4] B65D *3/30*
U.S. Cl. 229—5.5 **10 Claims**



1. A container for bulk materials comprising:

a stepped container body closed at the bottom and having a generally cylindrical container wall presenting inside and outside surfaces and a reduced diameter neck on said wall terminating in a generally circular top edge;

a shoulder interconnecting said container wall and neck and presenting inside of the container body a curved shoulder surface which curves between the inside surface of the neck and the inside surface of the container wall;

a metal reinforcing ring crimped on said top edge of the neck;

a rolled rim portion of said ring, said rim portion curving over said top edge of the neck and terminating in an edge biting into said outside surface of the wall below said top edge; and

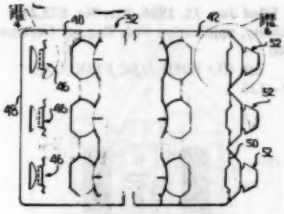
a band portion of said ring integral with said rim portion and extending generally downwardly therefrom along said inside surface of the neck, said band portion having a curled outwardly flared lip terminating in a lower edge located adjacent said inside surface of the wall to dispose said lower edge at an unexposed location recessed outwardly of said neck wherein fingers are not subject to catching on it.

4,708,284

LOCK ARRANGEMENT

Robert L. Sutherland, Campbell Hall, N.Y., and William M. Brown, Darien, Conn., assignors to Federal Paper Board Co., Inc., Montvale, N.J.

Filed Feb. 12, 1986, Ser. No. 828,547
Int. Cl.[4] B65D *5/04*
U.S. Cl. 229—48 R **23 Claims**



1. A lock arrangement for lockingly connecting together two closure panels and the like, said lock arrangement comprising a first panel having a first terminal edge and a second panel having a second terminal edge, said first panel having therein a cutout with a portion thereof spaced from and facing said first terminal edge defining a primary locking shoulder, said first panel also having therein adjacent said cutout on the side of said cutout remote from said first terminal edge a cut line including a curved portion defining a secondary locking ear facing away from said cutout and a generally straight portion for receiving a secondary locking tab, and said first panel having adjacent said generally straight cut line portion on the side of said cut line facing said cutout opening means for defining an opening in said first panel for facilitating entry of a nose of a secondary locking tab through said first panel along said cut line, and at least one primary locking tab and at least one secondary locking tab carried by said second panel.

4,708,285

FLOPPY DISK DIRECTORY ENVELOPE FORM

Peter L. Segall, 117 E. 77th St., New York, N.Y. 11021

Filed May 7, 1986, Ser. No. 860,500
Int. Cl.[4] B65D *27/00*
U.S. Cl. 229—68 R **12 Claims**

1. An envelope form, comprising:

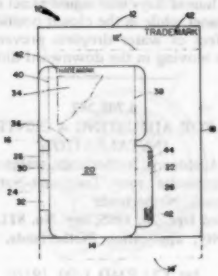
(a) a standard sized sheet of paper;

(b) perforation means defining an envelope blank having a front panel, and a rear panel disposed adjacent to said front panel, said panels having associated therewith envelope closing extensions;

(c) said panels being disposed on said sheet at a position where a directory may be caused to be printed on said sheet;

(d) a self-adhesive layer disposed on each of said extensions;

(e) protective means disposed over each of said self-adhesive areas; and



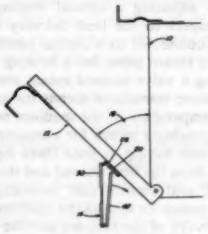
(f) said perforations defining a label, said label having a self adhesive material disposed on the same side of said sheet as said adhesive layer disposed on said extensions and an adhesive protective layer disposed over said self adhesive layer.

4,708,286

MAIL-CALL SIGNAL DEVICE

James E. Norris, 3 Suzette Dr., Springfield, Ill. 62702

Filed Dec. 15, 1986, Ser. No. 941,688
Int. Cl.[4] A47G *29/12*
U.S. Cl. 232—35 **9 Claims**



1. A mail-call signal device for use with a mailbox having a front door pivotally mounted at the bottom of said mailbox, wherein said mail-call signal device is secured to the exterior side of said mailbox door comprising:

(a) an anchoring member mounted on the exterior side of said mailbox door used to secure said mail-call signal device to said mailbox door to permit the movement of said device between the closed position to indicate the absence of mail and the open position to indicate the presence of mail;

(b) a face panel pivotally mounted at the top of said anchoring member which pivots out and away from said anchoring member when said mailbox door is opened and returns to the original position when said mailbox door is closed, thereby always revealing the exterior side of said face panel;

(c) a signal panel hingedly mounted to the bottom of said face panel which pivots downward and away from said face panel when said mailbox door is opened to a fully extended vertical position below said mailbox door visible from all directions to indicate the presence of mail and remains fully extended when said mailbox door is closed;

(d) a spring means located between said face panel and said

signal panel to actuate said signal panel to move away from said face panel when said mailbox door is opened, ensuring that said signal panel will always be thrust away from said face panel so the force of gravity can pull it down, wherein said spring member also ensures that on extremely humid days said signal panel does not stick to said face panel while in the closed position caused by the suction effect of water droplets preventing said signal panel from moving in the downward direction.

4,708,287

APPARATUS FOR ADJUSTING A CENTRAL HEATING INSTALLATION

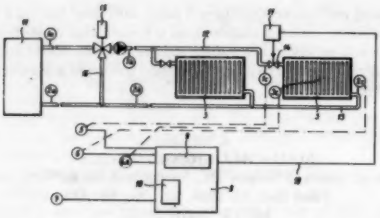
Jan B. De Wit, Apeldoorn, Netherlands, assignor to Nederlandse Centrale Organisatie voor Toegepast-Natuurwe-Tenschappelijk Onderzoek, Netherlands

Filed Dec. 20, 1985, Ser. No. 811,949

Claims priority, application Netherlands, Dec. 24, 1984, 8403945

Int. Cl.[4] F24D *3/00, 19/10*

U.S. Cl. 237—8 R **8 Claims**



1. Apparatus for adjusting a central heating installation particularly with respect to the heat delivery of associated radiators which are connected to a central heating source by means of supply and return pipes for a heating medium, the supply pipe including a valve control means comprising first and second temperature transducer means for measuring the supply and return temperature of the medium respectively, a third temperature transducer means for measuring room temperature, a control unit having at least three input terminals supplied with inputs from the first, second and third transducer means, respectively, said control unit including calculating means and memory means for storing the relationship between the relative heat delivery of the radiator and the relative mass flow of the heating medium using as parameters the differences between supply, return and room temperatures and the heat delivery characteristics of the radiator and for storing input data, measured temperatures and calculated heat delivery, the control unit reacting to the input signals and the memory information for providing a control signal to an indicating means and/or to said valve control means for adjusting the flow of the heating medium into the radiator.

4,708,288

METHOD AND APPARATUS FOR PNEUMATICALLY DISCHARGING HYDROMECHANICALLY CONVEYED HYDRAULIC BUILDING MATERIAL FOR UNDERGROUND OPERATIONS

Karl-Ernst von Eckardstein, Kamen, Fed. Rep. of Germany, assignor to Friedrich Wilh. Schwing GmbH, Fed. Rep. of Germany

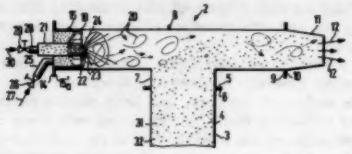
Filed Sep. 27, 1984, Ser. No. 654,739

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1983, 3335953924; European Pat. Off., Aug. 25, 1984, 84110148

Int. Cl.[4] B05B *17/04*

U.S. Cl. 239—9 **6 Claims**

1. An improved method for pneumatically discharging hydromechanically conveyed hydraulic building material from a nozzle wherein, upstream from the nozzle the building material, which is pumped toward the nozzle in a dense stream, is combined with an activator for accelerating the hardening of the building material and also united with a compressed air stream so that the building material and activator are entrained in the air stream and conveyed thereby to the nozzle for discharge therefrom, the improvement comprises the steps of:



causing the air stream to be turbulent when it encounters the dense stream of building material; and

distributing the activator to the turbulent air stream before it encounters the dense stream of building material.

4,708,289

INJECTION VALVE

Piotr Szablewski, Frankfurt am Main, and Wolfgang Sauerschell, Oberursel, both of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 11, 1986, Ser. No. 873,246

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1985, 3521040

Int. Cl.[4] B05B *1/34*; F16K *31/02*

U.S. Cl. 239—125 **10 Claims**

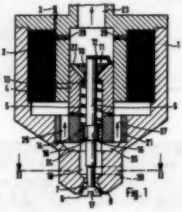


Fig. 1

1. An injection valve, particularly for fuel-injection systems of internal combustion engines, comprising:

a valve seat, a movable closure element which cooperates with said valve seat, a magnet winding, a magnet core, an armature which is connected to said closure element and a swirl chamber located within the injection valve; and wherein

said closure element has an outwardly diverging outer surface which rests, from the outside of the valve, against said valve seat, said closure element being movable outwardly for opening the valve; and

a further seat is disposed on said armature on the side thereof facing away from said closure element, and wherein said closure element comprises a shaft which passes with clearance through said armature and terminates in a hemispherical element, said shaft being supported swingably by means of said hemispherical element in said further seat.

10. An injection valve, particularly for fuel-injection systems of internal combustion engines, comprising:

a valve seat, a movable closure element which cooperates with said valve seat, a magnet winding, a magnet core, an armature which is connected to said closure element and a swirl chamber located within the injection valve; and wherein

said closure element has an outwardly diverging outer sur-

face which rests, from the outside of the valve, against said valve seat, said closure element being movable outwardly for opening the valve;

a return-flow connection for fuel from the swirl chamber, said connection being continuously open when the closure element is positioned for closing the valve and for opening the valve; and wherein

said continuously open return connection extends from the swirl chamber and is conducted both through said armature and also over its outside through the magnet winding to an outlet of said housing.

4,708,290

LAWN SPRINKLERS FOR LAWNS

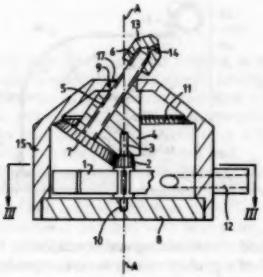
Dennis R. C. Osmond, St Albans, England, assignor to Hozelock-ASL Limited, Buckinghamshire, England

Filed Feb. 11, 1985, Ser. No. 700,186

Claims priority, application United Kingdom, Feb. 21, 1984, 8404490

Int. Cl.⁴ B05B 3/04

U.S. Cl. 239—227 **10 Claims**



1. A lawn sprinkler having a body with an inlet for admitting water to an interior of said body, a rotor mounted to rotate about a vertical axis in the base of said body, a pinion disposed within said body above said rotor and rotatable with said rotor about the said vertical axis, a stationary horizontal ring gear on an internal wall of said body which is disposed above said pinion so that said vertical axis coincides with the central axis of symmetry of said ring gear, a beveled planet gear which meshes both with said ring gear and said pinion and which is at an angle of inclination to the horizontal, said planet gear having a central aperture, a hollow distribution shaft extending at said angle of inclination with respect to the vertical from a lower end at which said distribution shaft is coaxially attached to said planet gear and communicates by means of said central aperture in said planet gear with the interior of said body, and an upper end which projects upwardly from said body and has an outlet nozzle for the delivery of water, a carrier which is rotatably mounted about the vertical axis and which rotatably supports said distribution shaft for rotation of the latter about its inclined axis, the arrangement of the foregoing elements being such that water entering said inlet impinges upon and rotatably drives said rotor which in turn drives said planet gear to cause said distribution shaft to rotate about its own inclined axis with respect to said carrier and simultaneously to rotate about said vertical axis with said carrier as water passes from the interior of said body, through said central aperture in said planet gear, upwardly through said distribution shaft to emerge as an outlet jet or spray from said nozzle.

4,708,291

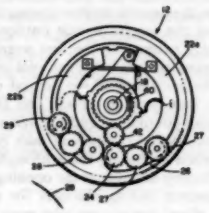
OSCILLATING SPRINKLER

Michael J. Grundy, Phelan, Calif., assignor to The Toro Company, Minneapolis, Minn.

Filed Dec. 16, 1986, Ser. No. 942,466

Int. Cl.⁴ B05B 3/16

U.S. Cl. 239—242 **7 Claims**



1. An improved sprinkler of the type having a nozzle which is rotatable about an axis of rotation, a reversible drive means for rotating the nozzle about its rotational axis in opposed first and second directions, wherein the drive means includes a driven gear nonrotatably fixed to the nozzle and first and second final drive gears which normally rotate reversely relative to one another and which are alternately engageable with the driven gear for achieving the opposed directions of nozzle movement, wherein the improvement relates to the first and second final drive gears and comprises:

(a) means for pivotally supporting each of the final drive gears for a swinging motion towards and away from the driven gear to engage or disengage the driven gear, respectively; and

(b) means for rotating each of the final drive gears reversely relative to the normal rotation thereof when each final drive gear is pivoted away from the driven gear, thereby allowing the final drive gears to more easily disengage the driven gear.

4,708,292

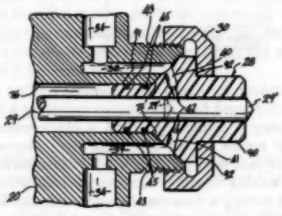
FOAM DISPENSING GUN WITH IMPROVED MIXING CHAMBER

Robert C. Gammons, Southington, Conn., assignor to Olin Corporation, Cheshire, Conn.

Filed Jun. 5, 1985, Ser. No. 741,508

Int. Cl.⁴ B05B 7/02

U.S. Cl. 239—414 **29 Claims**



1. A deformable nozzle in which plural components are mixed for use in a plural component dispensing apparatus and mountable thereto and retained in place by nozzle retaining means having, in combination;

(a) a central elongate bore;

(b) a first nozzle portion circumscribing a portion of the bore, the first nozzle portion receiving the nozzle retaining means thereabout such that when the nozzle retaining means is removed from the first nozzle portion the nozzle

is removable from the apparatus without further apparatus disassembly;

(c) a second nozzle portion circumscribing a second portion of the bore;

(d) a central nozzle portion circumscribing a third portion of the bore having a first contact surface at the terminus of the first nozzle portion that contacts the nozzle receiving means when the apparatus is assembled and an opposing second contact surface at the terminus of the second nozzle portion, the central portion connecting the first nozzle portion and the second nozzle portion, the first contact surface being external to the first nozzle portion and the second contact surface being external to the second nozzle portion, the periphery of the central nozzle portion between the first contact surface and the second contact surface being continuous and uninterrupted; and

(e) at least two plural component inlet ports in the central nozzle portion extending therethrough and opening into the bore thereby defining at the opening of each inlet port an impingement mixing chamber for the plural components, the plural component inlet ports further being oriented at an angle to the bore in a horizontal plane.

4,708,293

ATOMIZER FOR VISCOUS LIQUID FUELS

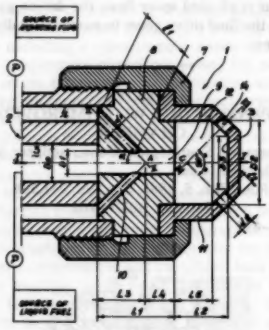
Mario Graziadio, and Sergio Ligasacchi, both of Piza, Italy, assignors to Enel-Ente Nazionale per l'Energia Elettrica, Rome, Italy

Continuation-in-part of Ser. No. 815,126, Dec. 30, 1985, abandoned, which is a continuation of Ser. No. 565,276, Dec. 27, 1983, abandoned. This application Jul. 23, 1986, Ser. No. 888,885

Claims priority, application Italy, Feb. 24, 1983, 19729 A/83; European Pat. Off., Jul. 14, 1986, 86830199.5

Int. Cl.[4] B05B 7/04

U.S. Cl. 239—427 **8 Claims**



1. An atomizer for liquid fuel, comprising first inlet means for a liquid fuel, said first inlet means including a central inlet passage having a diameter D_o and a predetermined length; second inlet means for an atomizing fluid disposed radially outwardly of said inlet passage; a first mixer including a first cylindrical mixing chamber communicating with said inlet passage and having a diameter D_1 such that D_o/D_1 is greater than 2, said first mixing chamber further having a length L_1 such that said predetermined length greatly exceeds L_1, and said first mixer also including at least three ducts disposed radially outwardly of said first mixing chamber and connecting the latter with said second inlet means, all of said ducts having essentially the same length l_1 and the same diameter d_1, and said ducts being substantially equally angularly spaced about said first mixing chamber and each having a longitudinal axis; and a second mixer including a second mixing chamber communicating with said first mixing chamber and having a cylindrical portion of diameter D_2 such that the cross-sectional area of said cylindrical portion is several times greater than the cross-sectional area of said first mixing chamber, said cylindrical portion further having a length L_5 such that L_5/D_2 is greater than 0.6, and said second mixing chamber additionally comprising a frustoconical portion having a peripheral frustoconical wall and a circular end wall of diameter D_3, said mixing chambers and said inlet passage having a common longitudinal axis, and the longitudinal axes of said ducts intersecting one another within said first mixing chamber at a first common point on said common longitudinal axis, said frustoconical wall being provided with a plurality of outlet passages having respective longitudinal axes which are substantially normal to said frustoconical wall and intersect one another within said cylindrical portion at a second common point on said common longitudinal axis, said end wall being substantially perpendicular to said common longitudinal axis, and the diameter D_3 of said end wall being such that D_3 is greater than or equal to the diameter D_1 of said first mixing chamber.

4,708,294

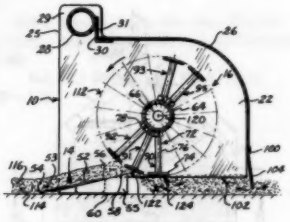
METHOD AND APPARATUS FOR CONDITIONING THE FLOOR OF A POULTRY REARING AREA

Edward F. Endom, P.O. Box 543, Ellisville, Miss. 39437

Filed Sep. 21, 1981, Ser. No. 304,333

Int. Cl.[4] B02C 21/02

U.S. Cl. 241—27 **16 Claims**



1. A method of revitalizing and conditioning for reuse, litter on the floor of a poultry raising area, comprising the steps of, positioning an elongated scraper blade at an acute angle to the plane of the floor of the area, with a leading edge of the blade at the elevation of the floor of the area to scrape litter from the floor, moving the scraper blade across the floor to scrape litter from the floor and to cause the scraped litter to move over the blade, maintaining the leading edge of the scraper blade at the elevation of the floor during the step of scraping to scrape the litter from the floor without damaging the floor, continually pulverizing the litter which moves over the blade with a rotary power driven pulverizer at a predetermined position with respect to the path of travel of the litter scraped by the blade, and discharging the so conditioned and pulverized litter onto the floor of the poultry raising area.

4,708,295

SYSTEM FOR WASTE PAPER CONDITIONING

Walter Musselmann, Heidenheim, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Apr. 9, 1985, Ser. No. 721,326

Claims priority, application Fed. Rep. of Germany, Apr. 17, 1984, 3414460; Jun. 8, 1984, 3421330

Int. Cl.[4] D21B 1/12, 1/32

U.S. Cl. 241—46.17 **4 Claims**

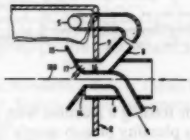
1. A secondary pulper adapted to receive pulp from a primary pulper in a system for the conditioning and reclaiming of waste paper, said secondary pulper comprising:

an essentially rotationally symmetric housing defining an accepted stock space, a tumbling space with an axis of rotation, and at least one end;

a screen mounted in said housing and separating said tumbling space and said accepted stock space;

an impeller wheel means for generating a vortex flow with a vortex axis positioned and operable in said housing, said vortex axis essentially coinciding with the axis of rotation;

a central drain line having an entrance, said central drain line connected to said one end of said housing and communicating with the tumbling space for removal of fiber suspension enriched with at least light dirt at said one end of said housing, said central drain line entrance having a flared portion surrounding said central drain line entrance, said flared portion containing an opening therein through which fiber suspension enriched with heavy dirt reenters the tumbling space;



a central pulp inlet sleeve on said housing at said one end thereof, said central pulp inlet sleeve having a diameter greater than that of said central drain line, which central drain line extends within and is surrounded in spaced relation by said central pulp inlet sleeve which has one end opening into the tumbling space; and,

a circumferential drain line communicating with said tumbling space, and a conduit connecting said circumferential drain line to said central pulp inlet sleeve for the removal of fiber suspension enriched with heavy dirt, such that a portion of said fiber suspension enriched with heavy dirt is introduced into the tumbling space through at least a portion of the space within said central pulp inlet sleeve surrounding said central drain line.

4,708,296

JET KNIFE STRUCTURE

Richard G. Powers, Overland Park; Joseph S. Zeets, Olathe, both of Kans.; Joseph G. Currier, Greenwood, and Lewis F. Alley, Kansas City, both of Mo., assignors to Marlen Research Corporation, Overland Park, Kans.

Filed Oct. 18, 1985, Ser. No. 789,080

Int. Cl.[4] B02C *18/30*

U.S. Cl. 241—82.2 **14 Claims**

1. A reducing assembly comprising:

a plate presenting an inlet face and an outlet face, and a plurality of apertures therethrough;

a knife including a blade presenting an elongated operating face, there being structure defining an elongated fluid-conveying channel generally along the length of said operating face and having a closed outermost end;

means mounting said knife for rotation thereof proximal to said plate with said blade operating face being adjacent said plate inlet face, said channel presenting a cross-sectional area taken along a section transverse to the longitudinal axis of said channel, said channel being in communication with successive ones of said apertures during said rotation of said blade such that said channel is in communication with successive aperture-defined open areas, the maximum area of said aperture-defined open areas in communication with said channel at any time during rotation of said blade being no greater than said channel cross-sectional area; and

means for introducing prressurized fluid into said channel during rotation of said blade for in turn introducing said fluid from said channel into said apertures during rotation of said blade.

4,708,297

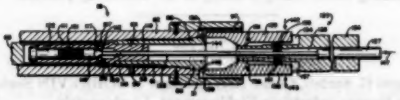
ARMATURE WINDING MACHINE WITH REMOVABLE COLLET AND SHROUDS

Arie Boers, Plymouth, Minn., assignor to Micafil, Inc., Minneapolis, Minn.

Filed Oct. 1, 1985, Ser. No. 782,431

Int. Cl.[4] H02K *15/09*

U.S. Cl. 242—7.05 B **29 Claims**



24. In a machine having means for winding coils of wire onto a slotted armature core having a shaft, comprising: core holding means for locating a core in a position to receive coils of wire from the means for winding coils of wire, said coil holding means having a support with a passage, a collet assembly operable to grip said shaft located within said passage to hold said core, means for moving the collet assembly in said passage to selectively cause said collet assembly to selectively grip and release said shaft including first means having at least one recess, means for releasably connecting the collet assembly to the first means including at least one movable member located in said recess, second means for holding the movable member in said recess, biasing means for yieldably holding the second means in a position wherein the second means retains the movable member in said recess thereby connecting the collet assembly to the first means, and third means for moving said second means to a release position to allow said movable member to move out of the recess whereby the collet assembly can be removed from the support as a unit.

4,708,298

WINDING APPARATUS

Vincent L. Allard, Staines, and Henry Gallard, Perivale, both of England, assignors to BICC Public Limited Company, London, England

Filed Jun. 18, 1985, Ser. No. 746,108

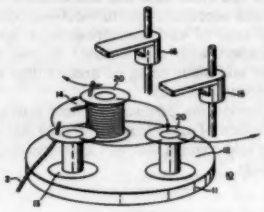
Claims priority, application United Kingdom, Jun. 20, 1984, 8415732

Int. Cl.[4] B65H *67/048*

U.S. Cl. 242—25 A **6 Claims**

1. Apparatus for winding cable onto a spool comprising a substantially horizontally mounted movable table; spool locating means for receiving at least three spools thereon with their longitudinal axes substantially vertically upright; means for rotating the table through at least three positions comprising: a loading position, a winding position and an unloading position;

spool loading means for loading an empty spool onto the spool locating means, the spool loading means being situated at the loading position; cable loading means for loading a cable onto an empty spool on the spool locating means, the cable loading means being situated at the winding position, the cable loading means comprises a pivotable tube through which the cable passes, cable clamping means for clamping the cable and cable bending means for bending the cable, the spool being provided



with an aperture, the pivotable tube being adapted to insert the bent cable through the aperture in the spool, spool winding means for rotating the spool locating means, the spool winding means being situated at the winding position for rotating the spool on the spool locating means and winding cable thereon; means for cutting the cable; and spool unloading means for removing a spool from the spool locating means, the spool unloading means being situated at the unloading position.

4,708,299

THREAD DELIVERY DEVICE

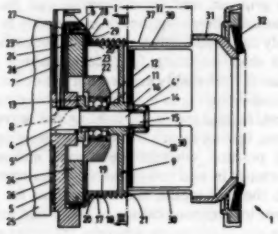
Alberto G. Sarfati, Como, Italy, assignor to SOBREVIN Societe de brevets industriels-Etablissement, Liechtenstein

Filed Jul. 21, 1986, Ser. No. 887,274

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1985, 3528816

Int. Cl.[4] B65H *51/22*

U.S. Cl. 242—47.01 **7 Claims**



1. A thread-delivery device comprising:

a storage body, said storage body including first and second sections, said sections being in axial alignment with one another;

said first section comprising a plurality of bars extending axially and defining a polygon for receiving loops of thread wound about said polygon;

a member configurated to form peripheral threading grooves intermediate said bars, said grooves including a bottom portion, said bottom portion being located radially inwardly of said bars, whereby said grooves are adapted to receive thread wound about said bars, said grooves having a front face for advancing the thread toward said second section;

extensions formed on said bars, said extensions constituting said second section of said storage body, said extensions forming a polygon, said thread being wound about said extensions and being removable from said second section, the circumferential length of the first section polygon being substantially equal to the circumferential length of the second section polygon.

4,708,300

APPARATUS FOR FEEDING A MACHINE WITH A PLURALITY OF WEBS OF MATERIAL FROM A PLURALITY OF WEB SUPPLY ROLLS

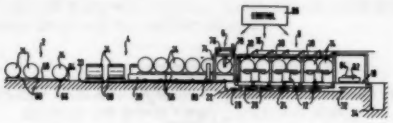
Willi Goetz, Seeheim, Fed. Rep. of Germany, assignor to Valmet-Strecker GmbH, Pfungstadt, Fed. Rep. of Germany

Filed Jan. 15, 1987, Ser. No. 3,505

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1986, 3601297

Int. Cl.[4] B65H *19/18*

U.S. Cl. 242—58.1 **21 Claims**



1. Apparatus for feeding a machine with a plurality of webs of material from a plurality of web supply rolls, said apparatus comprising, in combination:

(a) a plurality of roll stands, positioned opposite one another in pairs, each pair being adapted to rotatably support a single web supply roll, said roll stands being arranged to support a plurality of rolls with the pool axes in parallel;

(b) a loading car for carrying rolls, arranged to run between the roll stands on both sides and capable of receiving simultaneously the entire number of the rolls which can be mounted in the apparatus, with the spacing of the respective rolls corresponding to that of the successive roll mounting axes in said roll stands;

(c) means for removing the roll cores released from said roll stands;

(d) means, disposed above the rolls mounted on said roll stands, for temporarily holding the ends of the webs of material drawn into the machine during a roll change operation; and

(e) a web supply roll preparation section including:

(1) a plurality of successive roll preparation stations arranged adjacent the path of travel of said loading car for the individual preparation of new web supply rolls; and

(2) a loading car loading station following said roll preparation stations in succession, for successive transfer of the prepared rolls onto said loading car.

4,708,301

TAKE-OUT/TAKE-UP TENSION CONTROL APPARATUS

Hiroshi Kataoka, 3686, Sangawacho, Iyomishima-shi, Ehime 799-04, Japan

Filed Sep. 3, 1985, Ser. No. 771,821

Int. Cl.[4] B65H *23/02, 77/00*

U.S. Cl. 242—75.51 **2 Claims**

1. A take-out tension control apparatus for controlling tension in a film or sheet, the film or sheet being fed out from a stretching device for stretching a film or sheet to a predetermined thickness by holding the opposite ends of the film or sheet with clips, said take-out tension control apparatus comprising:

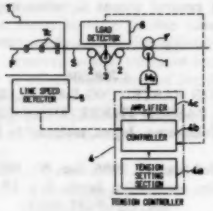
a take-out roller for taking out the film or sheet having been released from the clips;

a motor for driving said take-out roller;

tension detecting roller means for detecting tension in a portion of the film or sheet disposed between the stretching device and said take-out roller;

a speed detector for detecting the line speed of the stretching device; and

control means for receiving a tension value detected by said tension detecting roller means and a line speed value



detected by said speed detector and transmitting an optimum drive value to said motor.

4,708,302

MODE SWITCHING OVER GEAR MECHANISM FOR REEL

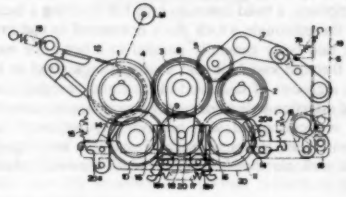
Katsumi Yamaguchi; Syouichiro Yokoi; Takao Kanai, and Kikuo Yoshikawa, all of Tokyo, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan

Filed Jan. 6, 1987, Ser. No. 630

Claims priority, application Japan, Jan. 14, 1986, 61-6053; Jan. 29, 1986, 61-15927

Int. Cl.[4] G11B *15/32, 19/02, 15/00*

U.S. Cl. 242—204 **2 Claims**



1. Mode switching over gear mechanism for reel used in adigital audio type tape recorder having a rotating head, comprising;

a winding reel for winding a tape at the play mode in said tape recorder;

a supply reel for sending out said tape at said play mode;

a reel driving gear rotated by a reel motor;

a center gear disposed between said winding reel and said supply reel and engaged with said reel driving gear;

a take-up gear disposed between said center gear and said winding reel and engaged with said center gear and said winding reel at said play mode so as to link them;

a fast forward gear engaged always with said winding reel;

a rewinding gear engaged always with said supply reel;

a linking arm for fast forward/rewinding, whose one end is mounted on the shaft of said center gear, having friction with respect to said center gear;

a linking gear for fast forward/rewinding mounted on the other end of said linking arm, engaged selectively with said fast forward gear or said rewinding gear, depending on the rotational direction of said linking arm;

two reel brakes disposed at the outside of said fast forward gear and said rewinding gear, respectively, and thrusted thereagainst at said play mode;

two preload brakes disposed at the inside of said fast foward gear and said rewinding gear, respectively, and thrusted thereagainst at the tape loading mode and at the fast forward/rewinding mode;

a first control member for controlling thrust and separation of said reel brakes with respect to said fast forward gear and said rewinding gear; and

a second control member for controlling engagement and disengagement of said take-up gear with respect to said fast forward gear and said rewinding gear and thrust and separation of said preload brakes with respect to said fast forward gear and said rewinding gear.

4,708,303

DRAG CONTROL MECHANISM FOR USE IN FISHING REELS

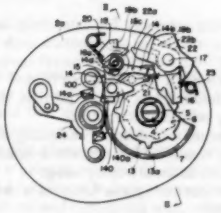
Masaharu Emura; Haruo Uetsuki; Atsuhito Aoki, and Takehiro Kobayashi, all of Fuchu, Japan, assignors to Ryobi Limited, Hiroshima, Japan

Filed Jan. 15, 1986, Ser. No. 819,143

Claims priority, application Japan, Jan. 16, 1985, 60-4805[U]; Jan. 21, 1985, 60-7030[U]; Nov. 28, 1985, 60-184215[U]

Int. Cl.[4] A01K *89/02*

U.S. Cl. 242—218 **23 Claims**



1. In a drag control mechanism for use in a fishing reel which comprises a reel body, a handle, a shaft coupled to said handle for rotation thereby and rotatingly mounted to said reel body, a master gear mounted on said shaft for rotation therewith, a spool rotatingly mounted on said reel body and coupled to said master gear for rotation therewith, a drag mechanism mounted on said shaft to apply a drag force against said master gear, and a ratchet wheel secured to said shaft, the improvement which comprises:

said drag mechanism including a drag control member threadedly mounted on said shaft, said drag control member being normally rotatable jointly with said handle to remain at a given distance along the length of said shaft from the master gear, said drag control member being movable to another distance along the shaft relative to the master gear when rotation of the drag control member jointly with said handle is blocked;

a drag pawl rotatably mounted on said reel body and selectively engageable with or disengageable from said drag control member;

a reverse rotation preventing pawl mounted on said reel body and selectively engageable with or disengageable from said ratchet wheel;

a drag switch means mounted on said reel body and being swingable between an ON position and an OFF position, said drag switch means being couplable to the drag pawl and the reverse rotation preventing pawl;

said drag switch means being operable when at the ON position for placing said drag pawl in engagement with said drag control member to prevent the rotation thereof and for disengaging said reverse rotation preventing pawl from said ratchet wheel to permit reverse rotation of said shaft for controlling the drag force of said drag mechanism by the movement of said drag control member along said shaft upon the rotation of said handle; and

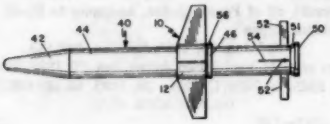
said drag switch means being operable when at the OFF position for disengaging said drag pawl from said drag control member to permit its rotation with said shaft and for re-engaging said reverse rotation preventing pawl

with said ratchet wheel to prevent the reverse rotation of said shaft.

4,708,304
RING-WING

Larry D. Wedertz, Mira Loma, and Lynn J. Swann, LaVerne, both of Calif., assignors to General Dynamics, Pomona Division, Pomona, Calif.

Filed Dec. 27, 1985, Ser. No. 813,894
Int. Cl.[4] F42B *13/24*
U.S. Cl. 244—3.26 **14 Claims**



1. A ring-wing assembly for extending the range and controllability of a missile, in combination with a missile adapted to be launched from a barrel, said barrel having a nose and; said missile comprising a generally elongated cylindrical body having a longitudinal axis, a nose portion, and a rear portion; said ring-wing assembly comprising:

stop ramp means for generally encircling a missile body, said stop ramp means having a forward-tapering ramp portion; and a sleeve assembly comprising:

a sleeve for encircling the body of a missile; said sleeve comprising:

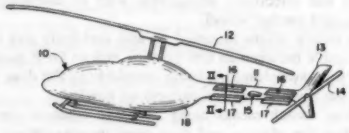
a substantially smooth rear inside tapered portion having a taper angle that is less than that of the ramp portion of said stop ramp means for progressive, shock-reducing engagement and for an interference fit with said ramp portion; and

a plurality of wings peripherally mounted on said sleeve; said sleeve assembly for initial mounting at the nose end of a launch barrel such that a missile upon launch passes through said sleeve assembly until said ramp portion encounters and engages with said sleeve assembly, whereupon said sleeve assembly travels with the missile.

4,708,305
HELICOPTER ANTI-TORQUE SYSTEM USING FUSELAGE STRAKES

Henry L. Kelley, and John C. Wilson, both of Newport News, Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jan. 30, 1987, Ser. No. 8,895
Int. Cl.[4] B64C *5/06, 27/06*
U.S. Cl. 244—17.19 **19 Claims**



1. A helicopter torque control system comprising:

a helicopter;

said helicopter having a main rotor attached thereto;

said helicopter having a fuselage extending rearward through rotor downwash;

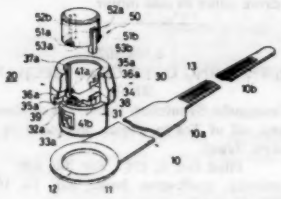
helicopter torque control means consisting of a combination of two strake devices, the upper strake being located above the lower strake and both strake devices located only along the side of said fuselage which faces the approaching main rotor blade, for altering rotor downwash, thereby altering lateral aerodynamic force of the fuselage so as to counter main rotor torque; and

supplemental control means to assist in controlling main rotor torque.

4,708,306
DEVICE FOR FASTENING BAND-LIKE MEMBER PASSED THERETHROUGH

Seiji Mitomi, Yokohama, Japan, assignor to Nifco, Inc., Yokohama, Japan

Filed Sep. 15, 1986, Ser. No. 907,567
Claims priority, application Japan, Sep. 19, 1985, 60-143335
Int. Cl.[4] F16L *3/03*
U.S. Cl. 248—74.3 **7 Claims**

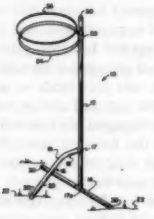


1. A device for fastening a band-like member passed therethrough, comprising a body having an inner surface and an outer periphery, a band insertion hole for inserting a band-like member therethrough; a lock piece connected to and projecting from said body generally parallel to a band-like member inserted through said hole and having a lock pawl to be engaged in a groove of said band-like member inserted through said band insertion hole to prevent retraction; and an operating member interconnected with and slidably mounted on said body for movement transversely of said hole and engageable with said lock piece upon being manually moved relative to said body.

4,708,307
STAND FOR HOLDING LEAF BAGS

Rosaire Daigle, 9715 Rex St., Hudson, Fla. 34669

Filed Dec. 12, 1986, Ser. No. 941,181
Int. Cl.[4] A63B *55/04*
U.S. Cl. 248—97 **3 Claims**



1. A device that holds a leaf bag in an upright configuration and that holds the mouth of the leaf bag in an open configuration at the same time, comprising:

an upstanding base member;

stabilizing means for maintaining said base member in its upstanding configuration;

a fixed diameter ring member extending in cantilevered relation to said base member;

a variable diameter inner ring member comprising a flexible,

hollow tubular member of linear configuration formed into a circular configuration;

adjustment means for varying the diameter of said variable diameter ring member;

said adjustment means being a flexible tubular member of generally linear configuration the opposite ends of which are slideably received within opposite ends of said inner ring member to effect adjustment of the diameter of said inner ring member;

and a flexible bag member having its upper peripheral edge positioned in sandwiched relation to said inner and outer ring members.

4,708,308

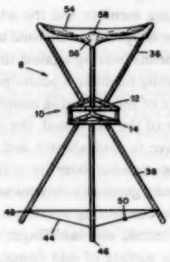
PORTABLE STOOL

Robert C. Snider, 5485 Spencer Hale Rd., Morristown, Tenn. 37814

Filed Jan. 14, 1986, Ser. No. 818,861

Int. Cl.[4] F16M *11/32*

U.S. Cl. 248—165 **6 Claims**



1. A stool comprising:

hub means;

a plurality of elongate seat leg members pivotally connected at one of their ends to said hub means;

a plurality of elongate support leg members pivotally connected at one of their ends to said hub means separately of said seat leg members for pivotal movement independently of said seat leg members;

seat means interconnecting said seat leg members at their ends opposite the ends connected to said hub means and configured to provide a seating surface extending between said ends interconnected by said seat means;

means for restricting said support leg members from pivoting on said hub means beyond a predetermined degree of separation in relation to adjacent support leg members; and

said hub means comprising a seat hub to which said seat leg members are pivotally connected, a support hub to which said support leg members are pivotally connected, means for detachably attaching said seat hub to said support hub and configured to maintain said seat hub in a fixed, spaced-apart relation to said support hub, and said support and seat leg members being pivotally movable on said support hub and seat hub, respectively, when said seat hub and support hub are maintained in said fixed, spaced-apart relation.

4,708,309

SUPPORTING DEVICE HAVING INFINITELY ADJUSTABLE JIBS

Herbert Walter, Müllheim, Fed. Rep. of Germany, assignor to Protoned B.V., Amsterdam, Netherlands

Filed May 1, 1986, Ser. No. 858,599

Claims priority, application Switzerland, May 13, 1985, 2036/85

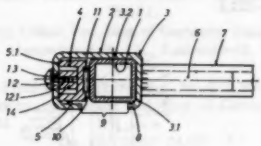
Int. Cl.[4] E04G *3/00*

U.S. Cl. 248—218.4 **4 Claims**

1. An adjustable supporting device for securing a jib to a support column, said supporting device comprising a jib connecting device having a clamping chuck with connecting means for connecting said jib to said clamping chuck and a tightening wedge to facilitate supporting engagement of said connecting device and said column;

said clamping chuck surrounding said column on three sides thereof for laterally placing said jib on said column and removing said jib therefrom, wherein said clamping chuck comprises:

a supporting wall, to which said jib is removably connected, extending over the width of a first side of said column, said supporting wall having a guide web which forms part of a centering means for said clamping chuck along said column;



a clamping plate connected to said supporting wall and extending over the width of a second side of said column adjacent to said first side of said column;

a U-shaped tightening wedge cage having a first side wall connected to said clamping plate and a second side wall which limits a passage opening in front of a fourth side portion of said column, which passage opening extends to said guide web on said supporting wall, wherein the opening of said U-shaped cage faces a third side of said column, opposite the first side of said column, for receiving said tightening wedge which is supported between said clamping chuck and a base of said cage, converging in the load direction of said jib.

4,708,310

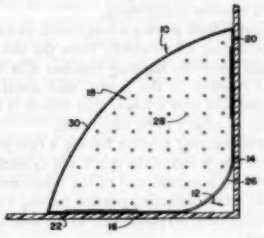
CORNER MOUNTED TRAY

Joe M. Smith, Las Vegas, Nev., assignor to Tri-State Enterprises, Osseo, Minn.

Filed Mar. 5, 1987, Ser. No. 22,008

Int. Cl.[4] E04G *3/00*

U.S. Cl. 248—220.1 **14 Claims**



1. A tray for mounting to vertical walls meeting at a corner, comprising

a bottom wall and a pair of converging side walls supporting the bottom wall;

the converging side walls each comprising a rectilinear recess extending from a shoulder intermediate the side walls and opening through the bottom wall to provide a passage between the bottom wall and the side walls;

a vertical rib, adjacent each of the recesses, extending intermediate the ends of the recesses; and

means for releasably attaching the tray to the vertical walls comprising

a pair of wall brackets having a top edge abutting the shoul-

der and including a planar backing member sized to pass through the passage and having a back side and a front side;

means integral with the backing member and extending rearwardly of the back side providing a slot of a size to receive the rib; and

means for connecting each of the brackets to a vertical wall.

4,708,311

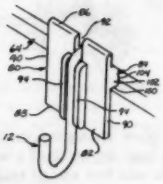
SLOT BOARD HANGING APPARATUS AND METHOD

Elvind Clausen, and Michael G. Allsop, both of Bellingham, Wash., assignors to Allsop, Inc., Bellingham, Wash.

Filed Jan. 7, 1986, Ser. No. 816,893

Int. Cl.[4] A47F 5/08

U.S. Cl. 248—222.2 **18 Claims**



1. A mounting assembly adapted to support objects, such as objects for display or convenient access, said assembly comprising:

a. a slot board having a generally vertically aligned front face and defining at a slot location a horizontal retaining slot opening to said front face, said board having a downwardly extending upper flange at said front face, said flange having a first downwardly facing upper surface defining an upper portion of said slot, and a second rear surface extending upwardly from said first surface with a substantial vertical component of alignment, said board having a third lower surface spaced below said first surface and defining a lower limit of said slot, said slot having a height dimension extending from said third lower surface to said first upper surface, and a width dimension extending from the front face at a location of said flange to said second surface;

b. a hanging member adapted to be mounted to the board at said slot location, said hanging member being a substantially rigid member comprising:

1. an elongate shank having a lengthwise axis and adapted to be extending downwardly from the slot location of the board when the hanging member is in its operating position relative to the board, said shank having an upper end and also a lower end which is arranged to attach to an object to be supported;

2. an interconnecting portion having a first end connecting to the upper end of the shank and extending laterally therefrom to a second end of the interconnecting portion, said interconnecting portion having a major alignment component perpendicular to the lengthwise axis of the shank;

3. a retaining finger having a lower end connecting to the second end of the interconnecting portion and extending upwardly therefrom, said finger having a lengthwise axis having a major alignment component perpendicular to said interconnecting portion;

c. a substantially rigid adapter to interfit with said slot board and said hanging member in an operational position so as to securely mount the hanging member to the board, said adapter comprising:

1. front plate means adapted to be positioned in said operating position forwardly of the front face of the board at the slot location, and comprising an upper plate means portion to engage the front face of the board above said slot, and a lower plate means portion adapted to engage the front face of the board below said slot;

2. a mounting member fixedly connected to the plate means and extending rearwardly therefrom, said mounting member having a substantially horizontal lower surface extending rearwardly from said plate means and adapted to bear against said third lower surface of the slot board, and an upper portion positioned adjacent to said first upper surface of the board when in said operating position;

d. said plate means and the upper portion of the mounting member defining a forwardly to rearwardly extending, open, horizontal recess configured to receive the interconnecting portion of the hanging member in a manner to restrain lateral movement of said interconnecting portion and so as to position said interconnecting portion adjacent to said first upper surface of the slot board;

e. said assembly being characterized in that with the slot board, the hanging member and the adapter in an assembled position, the adapter is positioned at said slot location with the plate means bearing against the front face of the board, the mounting member is positioned in said slot with the lower surface of the mounting member bearing against the third surface of the slot board, the hanging member is positioned relative to said adapter and said slot board so that the hanging member interfits with the adapter and said shank extends generally downwardly from the slot location, the interconnecting portion is positioned within said horizontal recess, and said finger extends upwardly adjacent the rear surface of said flange,

f. said mounting member being characterized in that with the mounting member positioned in said slot in said operating position and with the plate means positioned against the front face of the board, but without the hanging member being positioned in interfitting relationship with the adapter, the lower surface of the mounting member can pass unobstructedly forwardly over the third lower surface of the slot board, so that the adapter can be moved unobstructedly in a substantially forward direction away from said slot board,

g. said assembly being further characterized in that with the assembly in the assembled position, when a downward and laterally forward force is exerted on the shank of the hanging member,

1. the finger of the hanging member exerts a forward force component against the second rear surface of the slot board so as to be restrained from further forward movement,

2. the interconnecting portion of the hanging member bears downwardly against the mounting member of the adapter, which in turn bears against the third lower surface of the slot board,

3. any downward and forward force component exerted on the mounting member of the adapter which tends to rotate the lower plate means portion forwardly is resisted primarily by the upper plate means portion bearing rearwardly against the front face of the slot board above the slot, which in turn tends to cause said mounting member to move substantially forwardly from the slot, with such forward motion of the mounting member and the hanging member being resisted by the finger of the hanging member bearing against the slot board at the second rear surface.

4,708,312

EXTENSIBLE HEIGHT-ADJUSTABLE SWIVEL ARM FOR SUPPORTING A DISPLAY OR THE LIKE

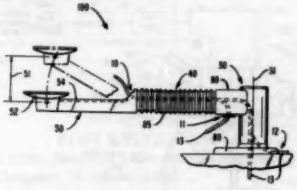
Lorenz Rohr, Augsburg, Fed. Rep. of Germany, assignor to NCR Corporation, Dayton, Ohio

Filed Oct. 10, 1986, Ser. No. 918,174

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1985, 8530047

Int. Cl.[4] E04G 3/00

U.S. Cl. 248—280.1 7 Claims



1. A swivel arm structure, comprising:

a base for fixedly supporting the structure;

an articulated member of three elements, the first element rotatable at its first end about the vertical axis of the base, a second element attached at its first end to a second end of the first element and rotatable about the vertical axis at such attachment, and a third element attached at its first end to a second end of the second element and rotatable about the vertical axis at such attachment;

a parallel lever arrangement translatable in the vertical plane, attached at one end to the second end of the third element; and

an apparatus support attached to the second, oppositely disposed end of the parallel lever arrangement.

4,708,313

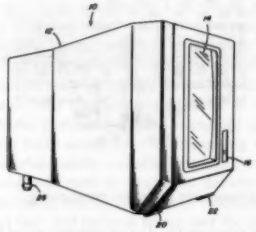
TILT APPARATUS FOR A DISPLAY MONITOR

Joseph L. Freni, Jr., Dracut, and John D. Ardito, Bedford, both of Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Mar. 31, 1986, Ser. No. 846,336

Int. Cl.[4] F16M 5/00

U.S. Cl. 248—649 5 Claims



1. Apparatus for supporting a display monitor in a plurality of tilt angles comprising

means for supporting a display monitor for pivoting on a supporting surface through a plurality of tilt angles, the supporting means being positioned forward of the center of gravity of the display monitor;

counterbalance means, positioned rearward of the center of gravity of display monitor, for supporting the rear end of the display monitor, the counterbalance means including

an elonated housing, closed on one end and having an aperture on the other end;

a piston disposed for reciprocable movement within the housing, the piston having a shaft extending through the aperture;

means for connecting the shaft to the display monitor with the elongated housing resting vertically on the support surface; and

a counterbalancing spring, positioned within the elongated housing between the piston and the closed end, such that downward movement of the piston compresses the spring;

the spring having a force range for counterbalancing the weight of the display monitor through the plurality of tilt angles.

4,708,314

ADJUSTABLE MARKING DEVICE FOR USE IN MOLD WALL

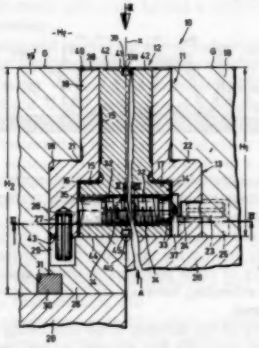
Franz Kühling, Lohne, Fed. Rep. of Germany, assignor to Hasco Normalien Hasenclever & Co., Ludenscheid, Fed. Rep. of Germany

Filed Mar. 7, 1986, Ser. No. 837,505

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, 3509274

Int. Cl.[4] B29C 33/00

U.S. Cl. 249—103 8 Claims



1. In combination with a mold for shaping a plastically moldable material and having a mold wall having an inner surface adapted to contact said material, an outer surface, and a stepped bore in said wall extending between and opening at both of said surfaces, a marking device received in said bore and having an end lying generally along said inner surface for marking an article formed by said material in said mold against said inner surface, said marking device comprising:

an axially elongated cylindrical stepped ring body received in said stepped bore and shaped complementarily thereto, said ring body having a small-diameter annular end terminating at said inner surface and a large-diameter annular end remote from said inner surface and exposable at said outer surface, said ring body having a stepped passage extending axially therethrough with a small passage step opening at said small-diameter end and a large passage step opening at said large-diameter end, said passage steps defining between them an annular shoulder turned away from said small-diameter end and transverse to an axis of said device;

means for fixing said ring body in said bore with said small-diameter end flush with said inner surface;

an axially elongated central body of circularly cylindrical cross section rotatably received in said stepped passage and formed with a large-diameter circular collar adapted to abut said shoulder and a cylindrical shank extending from said collar through said small passage step, said shank having an inner end carrying at least one marking formation adjacent said small-diameter end and an outer

end exposable at said outer surface, said small-diameter end of said ring body being circular and provided with a plurality of other marking formations selectively cooperating with said formation on said inner end of said shank;

indexing means for arresting said central body relatively angularly in any of a plurality of respective positions in each of which the formation on said inner end of said shank is angularly aligned with a selected respective one of said formations on said small-diameter end of said ring body to set the marking applied to said article; and

means including a formation on the outer end of said central body and accessible at said outer surface for rotating said central body in said ring body through said positions.

4,708,315

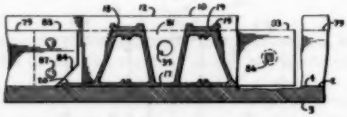
MULTIPLE PURPOSE CONCRETE FORM WITH SIDE RAIL STIFFENERS

Michael G. Carlson, Lenexa; Ronald A. Ward, Overland Park, both of Kans., and Terry H. Jolin, Lee Summit, Mo., assignors to Western Forms, Inc., Kansas City, Mo.

Continuation-in-part of Ser. No. 862,249, May 12, 1986. This application Jun. 30, 1986, Ser. No. 880,038

Int. Cl.[4] E04G *11/10*

U.S. Cl. 249—192 **6 Claims**



1. A set of concrete form panels each comprising:

(a) a face sheet having front and back surfaces, top and bottom end edges and spaced side edges;

(b) rails affixed to said face sheet at said edges, projecting rearwardly and having inner and outer surfaces;

(c) a plurality of cross members mounted against said face sheet and extending between said rails to provide rigidity to said panel;

(d) a plurality of rail stiffener strips alternating on opposite surfaces of said rails and secured to said outer surfaces opposite said cross members, to said inner surfaces between said cross members, and with ends overlapping on opposite said inner and outer surfaces; and

(e) bores through said rails for inserting connecting means to join said panels together side by side.

4,708,316

VARIABLE RATE EGR VALVE WITH STEP MOTOR CONTROL AND METHOD THEREFOR

John E. Cook, Chatham, Canada, assignor to Canadian Fram Limited, Chatham, Canada

Filed Dec. 7, 1984, Ser. No. 679,198

Int. Cl.[4] F16K *31/126*; F02M *25/06*

U.S. Cl. 251—39 **4 Claims**

1. A variable flow rate valve comprising;

a housing defining a pressure chamber,

a flexible diaphragm secured to said housing and defining an end of said pressure chamber, said diaphragm movable in one direction in response to decreases in the pressure within the pressure chamber and movable in an opposite direction in response to increases in the pressure within said pressure chamber;

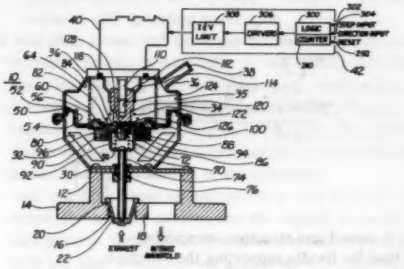
means independent of said diaphragm for providing a variable mechanical position limit or stop for said diaphragm in said one direction including an axially extending member;

means for selectively varying the pressure within said pressure chamber for causing said diaphragm to move in response to the pressure differential thereacross for engagement with said stop means;

wherein said varying means comprises;

an opening through said diaphragm,

valve means including a valve, positioned opposite said member proximate another side of said diaphragm for closing off communication through said opening, said valve means further including means for biasing said valve to close said opening wherein when said valve seals said opening pressure within said pressure chamber is permitted to decrease thereby moving said diaphragm in said one direction into engagement with said member and wherein when said valve is apart from said opening pressure within said chamber is permitted to increase moving said diaphragm in said opposite direction apart from said member, wherein said member includes a nut threadably and axially movable relative to a lead screw, said lead screw rotated by a step motor in response to control signals input thereto.



4,708,317

ELECTROMAGNETIC ACTUATOR

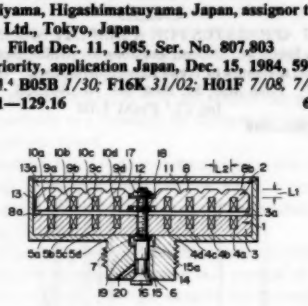
Yasuhiro Hiyama, Higashimatsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Dec. 11, 1985, Ser. No. 807,803

Claims priority, application Japan, Dec. 15, 1984, 59-263769

Int. Cl.[4] B05B *1/30*; F16K *31/02*; H01F *7/08, 7/00*

U.S. Cl. 251—129.16 **6 Claims**



1. An electromagnetic actuator comprising:

a housing;

a fixed electromagnet fixed to said housing and having a core member having a substantially flat surface plane with a plurality of slots formed therein, and coil elements disposed in each slot so that directions of current in adjacent slots are reversed;

a moveable electromagnet moveably mounted in said housing and having a core member having a substantially flat surface plane with a plurality of slots formed therein, and coil elements disposed in each slot so that directions of current in adjacent slots are reversed;

said substantially flat surface planes of said fixed electromagnet and said moveable electromagnet being juxtaposed and said slots being located in opposed corresponding positions in said fixed electromagnet and moveable electromagnet;

said moveable electromagnet moving with respect to said fixed electromagnet in response to generation of magnetic attraction or repulsion forces in said fixed and moveable electromagnets generated by simultaneous excitation of their respective coils; and

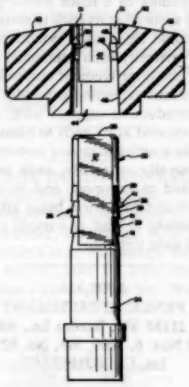
mechanical output means including a shaft having a first end coupled to said moveable electromagnet, said shaft being shifted by the motion of said moveable electromagnet to develop a mechanical output of said actuator.

4,708,318

POST VALVE HANDLE

Donald M. Simo, Sheffield Lake, Ohio, assignor to The Scott & Fetzer Company, Westlake, Ohio

Filed Jul. 28, 1986, Ser. No. 889,767
Int. Cl.[4] F16K *31/60*
U.S. Cl. 251—292 **6 Claims**



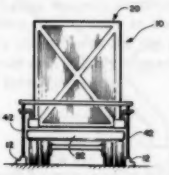
1. A valve and handle assembly comprising a valve body assembly, a valve stem rotatably mounted on said body assembly for opening and closing said valve, said stem providing an elongated projecting portion extending from said body assembly and providing axially extending wrenching flats, and barbs intermediate said flats substantially adjacent to said body assembly, said barbs providing axially extending ramps extending toward said body assembly with increasing diameter and terminating in substantially radially extending locking shoulders, and a handle formed of elastically deformable material providing a circumferentially continuous through bore having mating internal flats and internal ramps and shoulders proportioned to closely fit said barbs and flats on said stem, said handle being assembled on said stem by axial movement along said projection to an installed position causing mating ramps on said handle and stem to interengage and elastically deform said handle as said mating ramps move relative to each other to said installed position, said deformation of said material of said handle elastically returning to a substantially unstressed condition in said installed position on said stem and being permanently retained in such position against relative axial movement by interengagement of said shoulders, said mating flats on said stem and handle preventing relative rotation between said handle and stem, whereby said valve is opened and closed by rotating said handle without causing wear of said mating ramps and shoulders.

4,708,319

SYSTEM FOR RAISING AND LOWERING PORTABLE CARGO CONTAINERS

Graham J. Cruz, P.O. Box 8102, San Diego, Calif. 92102

Filed Jun. 16, 1986, Ser. No. 874,493
Int. Cl.[4] B66F *7/26*
U.S. Cl. 254—45 **7 Claims**



1. A system for raising and lowering portable cargo containers of the type having fittings at their bottom corners containing a pair of vertical surfaces formed at right angles to each other with each having holes adapted to serve as anchoring means comprising:

at least four screw jacks each having a support nut on their screw member;

means to raise and lower said screw jacks simultaneously;

at least four jack attachment brackets each of which comprises a major vertical plate member having a predetermined height H and having an elongated aperture in it adjacent its bottom end, a minor vertical plate member is rigidly connected to one edge of said major vertical plate member adjacent its bottom end to form a right angular structure, said minor vertical plate member having an elongated aperture in it adjacent its bottom end, and a horizontal support plate of a predetermined length L rigidly connected to the top edge of said major vertical plate member to form a right angular structure, said support plate having means for allowing a jack screw to pass vertically therethrough; and

a pair of stabilizing guide bars each having an aperture adjacent their opposite ends for receiving the top end of the screw jacks.

4,708,320

SELF ADJUSTING BELT TIGHTENING TOOL

Virgil D. Hodges, 7211 Oak Village, Humble, Tex. 77038

Filed Apr. 25, 1983, Ser. No. 488,425
The portion of the term of this patent subsequent to Jan. 24, 2003, has been disclaimed.
Int. Cl.[4] B66F *15/00*
U.S. Cl. 254—129 **1 Claim**

1. A self adjusting belt tightening tool comprising:

a rigid shaft having a first end and a second end wherein said second end defines a foot, rigidly attached to said shaft, having a convex upper surface and a concave lower surface;

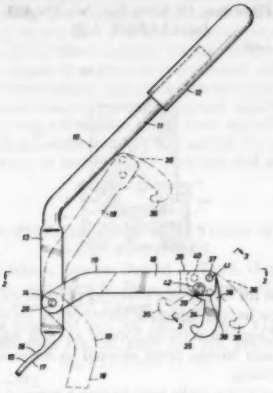
a grab bar having a first forked end and a second forked end with said first forked end pivotly mounted onto said shaft so positioned so that said second forked end pivots toward the concave lower surface of said foot and further with said second forked end having a plurality of bores therein;

a toe member having a hook on one end with the other end having a plurality of bores greater than the number provided in the grab bar, with said other end positioned within said second forked end of grab bar;

a stationary pivot pin positioned through one of said other end of said toe member;

a removable pivot pin positioned through another of said plurality of bores of said second forked end of said grab

bar and also selectively positioned through another of said plurality of bores of said other end of said toe member so



as to adjustably position said toe member in a fixed relation with respect to said grab bar.

4,708,321

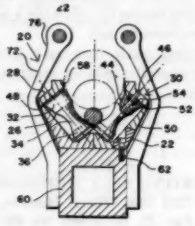
MULTIPLE SHEAVE ASSEMBLY WITH ANGLED ROLLERS

Shale J. Niskin, 3415 Chase Ave., Miami Beach, Fla. 33169

Filed Jun. 5, 1986, Ser. No. 870,924

Int. Cl.[4] B66D *1/36, 3/06*

U.S. Cl. 254—397 **2 Claims**



1. In a sheave assembly for supporting a cable having a tension applied thereto and which extends downward from said sheave assembly, said sheave assembly having a support frame and a plurality of rollers rotatably mounted to said support frame along a downwardly facing, arcuate path, the improvement comprising:

said rollers being positioned on opposed sides of a plane formed by said arcuate path, there being at least three said rollers on each of said opposed sides of said plane;

said rollers having their rotation axes disposed at an angle with respect to both said plane defined by said arcuate path and a line perpendicular to said plane so that each of said rotational axes of said rollers extends upward and outward with respect to said plane;

substantially one-half of said rollers being disposed on one side of said plane and substantially one-half of said rollers being disposed on the other side of said plane; and

each of said rollers having a plurality of curved-shaped portions of different concave curvatures dimensioned and configured to conform to cables having different diameters.

4,708,322

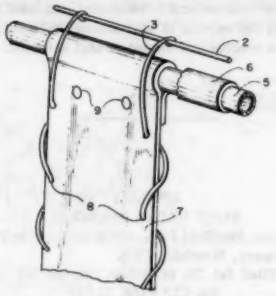
ELECTRIFIED FENCE GATE

Marvin E. Ratcliffe, Rte. 2, Box 206, Princeton, W. Va. 24740

Filed Dec. 8, 1986, Ser. No. 938,952

Int. Cl.[4] A01K *3/00*

U.S. Cl. 256—10 **8 Claims**



1. In an electrifiable fence gate having a flexible electrically conductive support wire extending generally horizontally and spanning a gate opening of a fence above ground level, said support wire being secured at its ends to elements of said fence, and a series of flexible electrically conductive gate wires extending generally vertically each connected at its upper end to said support wire, the improvement comprising:

a rigid support means extending generally horizontally adjacent to said conductive support wire, said rigid support means being secured at its ends to elements of said fence;

a series of flexible spacing means of non-conductive material extending generally vertically, each said spacing means being connected at its upper end to said rigid support means, each of said gate wires being attached to a respective spacing means at least at various positions along the length of said gate wire.

4,708,323

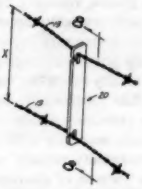
FENCE ATTACHMENT

Larry R. Noakes, 21155 SW. Sandra La., Aloha, Oreg. 97006

Filed Nov. 6, 1986, Ser. No. 927,913

Int. Cl.[4] B21F *27/00*

U.S. Cl. 256—35 **1 Claim**



1. In combination with a livestock confining fence of a type including at least two posts secured to the ground, at least two wires extending between said posts, one of the wires being spaced above the other wire by a predetermined distance, the improvement consists of:

an elastomeric elongated member having a front edge, a rear edge parallel to mid-front edge, top and bottom edges and two parallel sides, the distance between the sides being substantially less than the distance between the front and rear edges;

first holding means adjacent the top edges of said elongated member for receiving said one top wire, said first holding means comprising a first slot disposed in said front edge, the length of said first slot being less than the diameter of said one wire whereby said one wire can be forced through said first slot causing temporary deformation of

the walls of said slot in the process, said first holding means including a first enlarged generally rectangular vertical opening between the sides of said elongated member, the first opening extending above and below said first slot and being located farther from the front edge of the elongated member than said first slot whereby said one wire will be held in said first opening after being forced through said first slot; and

second holding means adjacent to the bottom edge of said elongated member for receiving said other wire, said second holding means comprising a second slot disposed in said front edge, the length of said second slot being less than the diameter of said other wire whereby said other wire can be forced through said second slot causing temporary deformation of the walls of said slot in the process, said second holding means including a second enlarged generally rectangular vertical opening between the sides of said elongated member, the second opening extending above and below said second slot and being located farther from the front edge of the elongated member than said second slot whereby said other wire will be held in said second opening after being forced through said second slot; the front edge of said elastomeric elongated member being engaged with said at least two wires and the rear edge of said elastomeric elongated member facing the enclosure defined by the livestock confining fence; wherein, the spacing between the slots is predetermined relative to the normal spacing between said two wires and the elastomeric material of said elongated member cooperates with said two wires, such that the wires may be compressed, tensioned or maintained in their disposition relative to one another.

4,708,324

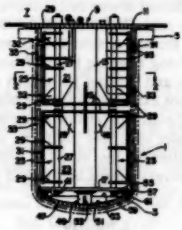
APPARATUS FOR IN SITU ANNEALING OF A PRESSURE VESSEL

Stanley R. Spiegelman, Pittsburgh; Phillip E. Miller, Greensburg, and Robert Shaffer, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 623,591, Jun. 22, 1984, Pat. No. 4,602,767. This application Feb. 12, 1986, Ser. No. 828,818

Int. Cl.⁴ C21D *9/00*

U.S. Cl. 266—87 **18 Claims**



1. Apparatus for in situ annealing of any of a series of upright cylindrical pressure vessels having a range of inner diameters and each of which is closed at the bottom with a concave inner bottom surface and is open at the top, said apparatus comprising:

a support structure which is lowered vertically into a selected vessel through said open top;

a set of heater support members angularly spaced around the support structure and radially extendable to within a preset distance of the cylindrical inner side wall of the selected vessel, said heater support members being in close angular proximity to each other to form an essentially continuous cylindrical surface when retracted;

bottom heater support means secured to the bottom of said support structure for forming a convex surface complimentary to and a preset distance from the concave inner bottom surface of the selected vessel; and

heater elements mounted on the heater support members and the bottom heater support means for generating heat to anneal the facing portion of said selected vessel, the number of heater support members being selected such that the angular gap between the heater support members when they are radially extended to said preset distance from the cylindrical wall of the pressure vessel of said series of pressure vessels having the largest diameter is no larger than that which permits the heater elements mounted on the heater support members to generate a substantially uniform heat density in the portion of the vessel wall radially aligned with the gap and the adjacent portions of the vessel wall radially aligned with the heater support members forming the gap.

4,708,325

INDUCTION HEATING SYSTEM FOR REHEATING THE EDGES OF A METALLURGICAL PRODUCT AND VARIABLE AIR GAP INDUCTOR ASSOCIATED THEREWITH

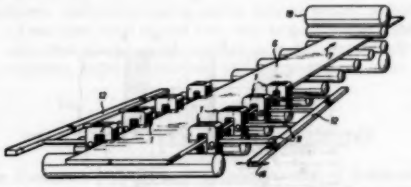
Philippe Georges, Terville, France, assignor to Institut de Recherches de la Siderurgie Francaise—IRSID, Maizieres-les-Metz, France

Filed May 28, 1986, Ser. No. 867,503

Claims priority, application France, Jun. 7, 1985, 85 08684

Int. Cl.⁴ H05B *5/00*; C21D *9/52*

U.S. Cl. 266—90 **9 Claims**



1. A device for the inductive reheating of the verges of a metallurgical product moving down a production line, of the type comprising inductors with C-shaped magnetic yokes set up laterally along the path followed by the verges and straddling said verges, the ends of each yoke facing one another and forming wound magnetic poles of opposite polarity, said device wherein said yokes are formed, for purpose of varying the air gap, or spacing between said poles, of two legs, joined by a hinge swivelable about an axis, each leg being made of a laminate having, at least at the level of the hinge, forming flanges thereon and two side cheeks accommodating two trunnions which do not traverse the laminate, and wherein a semicylindrical clearance is provided between the laminates of the two legs.

4,708,326

VENTED POURING CUP FOR MOLTEN METAL CASTING

Jerry W. Brockmeyer, Hendersonville; Leonard S. Aubrey, Arden; James E. Dore, and Clifford N. Soble, both of Hendersonville, all of N.C., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

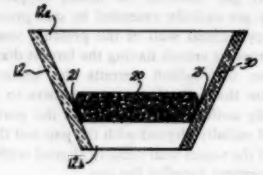
Filed Dec. 15, 1986, Ser. No. 941,809

Int. Cl.⁴ B22D *11/10*

U.S. Cl. 266—159 **13 Claims**

1. An apparatus for casting molten metal which comprises: a molten metal pouring cup; a source of molten metal upstream of said pouring cup; transfer means communicating with said pouring cup for transfering said molten metal from said pour-

ing cup to a casting station; vent means on said pouring cup at the interface between said pouring cup and transfer means to



permit release of entrapped gas downstream of the pouring cup.

4,708,327

DISCHARGE NOZZLE ASSEMBLY AND METHODS OF FORMATION AND OPERATION THEREOF

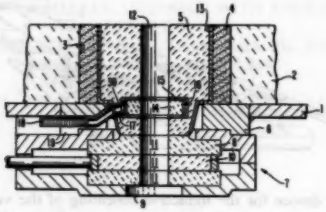
Rolf Waltenspühl, Hünenberg, Switzerland, assignor to Stopinc Aktiengesellschaft, Baar, Switzerland

Filed Mar. 13, 1986, Ser. No. 839,179

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1985, 3512907

Int. Cl.[4] C21C 5/48

U.S. Cl. 266—220 6 Claims



1. A discharge nozzle assembly for discharging molten metal from a metallurgical vessel, said assembly comprising:

a refractory nozzle brick having therethrough a discharge passage and having an outer surface;

a metal jacket surrounding said outer surface of said nozzle brick;

an annular member, formed of a refractory gas-permeable material, embedded in said nozzle brick and having an inner surface defining a discharge passage aligned with said discharge passage of said nozzle brick and spaced end surfaces confronting respective surfaces of said nozzle brick and an outer surface;

means for supplying a gas to said outer surface of said annular member, such that said gas passes through said annular member and enters said discharge passage from said inner surface of said annular member; and

means for preventing said gas from leaking from said annular member in directions other than radially inwardly therefrom into said discharge passage, said preventing means comprising a portion of said metal jacket surrounding said outer surface of said annular member and axially spaced annular metal flanges welded to said metal jacket and extending radially inwardly therefrom into said nozzle brick, with said annular member positioned axially between said pair of metal flanges, said portion of said metal jacket and said pair of metal flanges defining metal means encasing said outer surface and said spaced end surfaces of said annular member.

4,708,328

BRICK-LINING A METALLURGICAL VESSEL

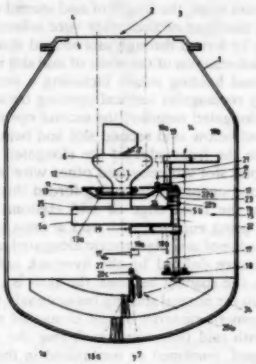
Wolfgang Heidemann, Duisburg, Fed. Rep. of Germany, assignor to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 10, 1985, Ser. No. 722,127

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1984, 3413806

Int. Cl.[4] C21C 5/44

U.S. Cl. 266—281 10 Claims



1. Device for brick lining metallurgical vessels, the respective vessels having a closed bottom, the device including a work area and platform being suspended for lifting and lowering into said vessel, further including a means for distributing lining bricks along the periphery of the work area and platform, the improvement comprising:

at least one brick delivery means removably affixed to the platform so as to extend above an upper side of said work area and platform, for moving bricks from a position resulting from operation of said distributing means, over and beyond said work area and platform; and

at least one, additional lower brick delivery means removably affixed to said platform and having a portion that extends below the lower side of said work area and platform, for receiving aligning bricks from said upper brick delivery means and placing them into a position below, including but not exclusively for the bottom of the vessel to be lined, said platform portion being of such dimensions which are smaller than said platform, so that every portion of the bottom of the vessel is within reach of said lower brick delivery means below said platform.

4,708,329

FLUID-FILLED POWER UNIT MOUNT DEVICE

Toshiyuki Tabata, Sagamihara; Hiroshi Aikawa, Atsugi; Yoshinari Fujiwara, Yachiyo, and Norio Yoda, Yotsukaido, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Kinugawa Rubber Ind. Co., Ltd., Chiba, both of, Japan

Continuation of Ser. No. 705,932, Feb. 26, 1985, abandoned. This application Nov. 24, 1986, Ser. No. 935,108

Claims priority, application Japan, Feb. 27, 1984, 59-34296

Int. Cl.[4] F16F 13/00, 9/08; B60K 5/12

U.S. Cl. 267—140.1 29 Claims

1. A fluid-filled power unit mount device comprising:

first and second base plates which are spaced from one another and securely connected to a vehicle body and a power unit, respectively;

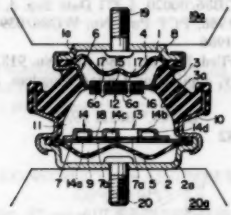
an elastic block securely interposed between said first and second base plates and being formed therein with a cavity;

a first diaphragm fixed to said first base plate;

a first partition plate fixed to said first base plate, said first

diaphragm being disposed between said first base plate and said first partition plate, said first partition plate defining a fluid chamber in said elastic block cavity, and said first diaphragm and said first partition plate defining a first auxiliary chamber, said fluid and auxiliary chambers being filled with a fluid and located on opposite sides of said first partition plate;

a first movable mechanism having a first movable member and being incorporated with said first partition plate, and a second movable mechanism positioned in said elastic block cavity and including a second movable member, said first and second movable members being independent and separate from each other to be independently movable, said first movable mechanism further having a first side in contact with the fluid in said fluid chamber, and a



second side in contact with the fluid within said first auxiliary chamber, said first and second movable members being in contact with the fluid in said fluid chamber and movable through the fluid under the first vibration in a first frequency range and being restrained from movement through the fluid under second vibration in a second frequency range which is lower than said first frequency range, said first vibration including first higher frequency vibration in a freqency range of from 250 Hz to 300 Hz, and a first lower frequency vibration in a frequency range of from 100 Hz to 170 Hz, said first movable member being movable under said first lower frequency vibration; and

means defining at least one orifice formed in said first partition plate to establish fluid communication between said fluid and first auxiliary chambers.

4,708,330

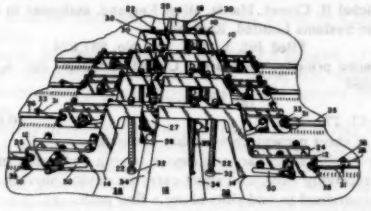
ALIGNMENT AND ASSEMBLY TOOL FOR VERY LARGE DIAMETER CYLINDERS

James H. Ehl, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation of Ser. No. 739,788, May 31, 1985, abandoned. This application Mar. 12, 1987, Ser. No. 25,039

Int. Cl.[4] B25B *1/20*

U.S. Cl. 269—43 **13 Claims**



1. An alignment and assembly tool for attachment to an interior of two very large diameter cylinders for precisely aligning and holding together said two very large diameter cylinders, said cylinders being aligned end-to-end and spaced far enough apart to accommodate a cylindrical strengthening section inserted between the near ends of said cylinders, said strengthening section having a cross-sectional area which is generally I-shaped and having two upper and two lower flanges, said cylinders and said strengthening section all being equal in diameter, said cylinders and said strengthening section being arranged and positioned so that ends of said cylindrical strengthening section touch said near ends of said two aligned large diameter cylinders, for welding said strengthening section to both said near ends of said two cylinders, said alignment tool comprising:

an inverted U-shaped main body comprising:

a horizontal top section having two ends,

two legs, each leg being attached to one of said ends of said top section, each leg extending downward and having an upper and lower end, and

two horizontal bottom sections, each said horizontal bottom section having two sides and each being attached to a respective said lower end of one of said legs and extending outward horizontally;

clamping means attached to said each of two horizontal bottom sections, said clamping means being a clamp jaw laterally movable against one of said sides of each of said two horizontal bottom sections, whereby a portion of said cylinders is clamped beween each said clamp jaw and its respective horizontal section; and

jackscrew means attached to said main body, aligning each of said end of said srengthening section with said near ends of said two very large diameter cylinders;

whereby said strengthening section may be welded to both of said near ends of said two very large diameter cylinders, thus attaching said two very large diameter cylinders together, aligned end-to-end with a strengthened joint.

4,708,331

DEVICE FOR LAYER-STACKING WEB-LIKE MATERIALS

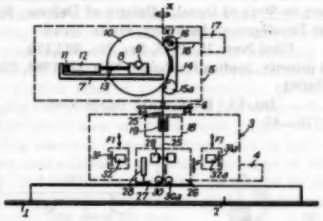
Jean Etcheparre, and Bernard Etcheparre, both of Bordeaux, France, assignors to Societe Anonyme: Letra Systemes, Cestas Bourg, France

Filed Apr. 4, 1986, Ser. No. 848,086

Claims priority, application France, Apr. 4, 1985, 85 05184

Int. Cl.[4] B65H *29/46*

U.S. Cl. 270—31 **8 Claims**



1. A device for layer-stacking web-like materials in plys with aligned selvedges, comprising a fixed laying table (1) on which a carriage (3) is mounted for sliding motion with respect thereto in a longitudinal direction, said carriage supporting a roll (10) of material for free rotation about an axis (9) on the carriage, the axis being on a support (8) and being held by pressure against at least one endless driving elastic belt (14) mounted on two vertically aligned rollers (15, 15*a*) extending inside a vertical plane tangent to the roll of material, said rollers being driven in rotation by a position and speed-controllable driving motor (17), an unobstructed vertical path extending through the carriage (3) to the fixed laying table, wherein

the material is unrolled and goes down freely in a vertical in order to be laid on the laying table (1) as the carriage moves in the longitudinal direction.

4,708,332

METHOD AND APPARATUS FOR ZIG-ZAG FOLDING WEBS OF PAPER AND THE LIKE

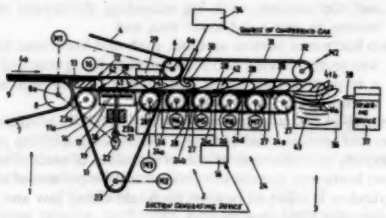
Alfred Besemann, Hamburg, Fed. Rep. of Germany, assignor to E.C.H. Will (GmbH & Co.), Hamburg, Fed. Rep. of Germany

Filed Jul. 2, 1986, Ser. No. 881,193

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1985, 3424246

Int. Cl.[4] B41L *1/32*

U.S. Cl. 270—39 20 Claims



1. A method of zig-zag folding a continuous web of paper or a like flexible material which has alternating first and second panels connected to each other by transversely extending weakened zones, comprising the steps of transporting the web at a first speed in a predetermined direction and along a first path; diverting at least a portion of each of successive first panels from the first path into a second path; and advancing the diverted first panels at a lower second speed while continuing to transport the second panels immediately following the diverted first panels at said first speed so that at least one of each pair of panels including a diverted first panel and the immediately following second panel develops a loop and the second panel of such pair of panels overlies the respective first panel.

4,708,333

METHOD AND APPARATUS FOR SEPARATING, FEEDING AND/OR FOLDING SHEETS

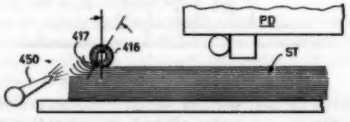
Rami Servi; Boaz Eidelberg; Daniel Granot, all of Haifa; Ehud Armoza, and Ephraim Sher, both of Carmiel, all of Israel, assignors to State of Israel, Ministry of Defense, Rafael Armament Development Authority, Haifa, Israel

Filed Nov. 25, 1985, Ser. No. 802,170

Claims priority, application Israel, Nov. 23, 1984, 73600; Jan. 4, 1985, 74001

Int. Cl.[4] B42C *1/00*; B65H *3/40*

U.S. Cl. 270—45 9 Claims



1. A method of sseparating and feeding sheets from a stack comprising the steps:

bringing a pick-up head into engagement with an intermediate portion of the top sheet of the stack;

bringing a pair of tubular restrainer rods against the opposite ends of the top sheet of the stack outwardly from the pick-up head but spaced inwardly of the outer edges of the top sheet;

applying an air stream through each of said restrainer rods and outwardly thereof through spaced points along their lengths to curl the ends of the top sheet of the stack;

applying an additional air stream from each of the opposite sides of the stack and directed inwardly to impinge against the stack and to aid in the separation of the free ends of said top sheet of the stack from the underlying sheets; and

moving said pick-up head with said pick-up top sheet away from the stack.

4,708,334

LAYING-UP WORKPIECES OF FLEXIBLE SHEET MATERIAL

John Flavell; Michael A. Nash, both of Coventry, and Anthony B. Tubb, Nuneaton, all of United Kingdom, assignors to Courtaulds Clothing Limited, London, England

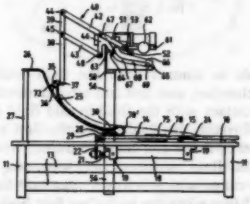
PCT No. PCT/GB86/00020, § 371 Date Sep. 3, 1986, § 102(e) Date Sep. 3, 1986, PCT Pub. No. WO86/03949, PCT Pub. Date Jul. 17, 1986

PCT Filed Jan. 13, 1986, Ser. No. 915,033

Claims priority, application United Kingdom, Jan. 14, 1985, 8500837

Int. Cl.[4] B65H *29/34*

U.S. Cl. 271—182 8 Claims



1. A device for depositing in a desired location a workpiece (75, 78) comprising a piece of flexible sheet material, the device comprising a tray (14) for supporting the workpiece (75, 78) in a flat condition in a position above a desired location, means (18) for retracting the tray (14), and restraining means for preventing retraction of the workpiece with the tray, whereby the workpiece (75, 78) can move downwards into the desired location as the tray (14) is retracted, characterised in that said restraining means comprises a flexible sheet (25), and means (40) for depositing the flexible sheet (25) over a workpiece (75, 78) on the tray (14) and for retaining it in contact with the workpiece (75, 78) as, during retraction of the tray (14), the workpiece (75, 78) moves off the tray (14) downwards into the desired location.

4,708,335

SHEET PRESENTING ASSEMBLY

David E. Wake; Anthony L. Robinson, both of Hampshire, and Michel R. Croset, Hants, all of England, assignors to De La Rue Systems Limited, England

Filed Jul. 3, 1986, Ser. No. 881,614

Claims priority, application United Kingdom, Jul. 4, 1985, 8516969

Int. Cl.[4] B65H *29/00*

U.S. Cl. 271—187 10 Claims

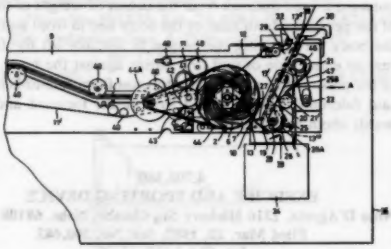
1. A sheet presenting assembly comprising:

a rotatable sheet carrying device having a plurality of sheet receiving slots, said sheet carrying device moving sheets contained in said slots along a first path;

a member defining a movable surface located externally of said first path;

a stripping device movable between a first position which intersects said first path and in which said stripping device strips sheets from a plurality of said sheet receiving slots to

form a stack of sheets and a second posiiton in which said stack of sheets is clamped between said stripping device and said movable surface; and



drive means adapted to move said stripping device and said movable surface with a stack of sheets clamped therebetween to a sheet-presenting station.

4,708,336

MODULAR CONSTRUCTION ASSEMBLY FOR WALL OF COURT

Robert L. Riblet, 87 rue A. Laurent, F 94120 Fontenay Sous Bois, France

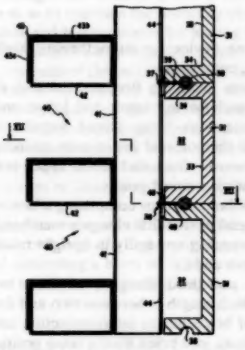
PCT No. PCT/FR84/00122, § 371 Date Jan. 4, 1985, § 102(e) Date Jan. 4, 1985, PCT Pub. No. WO84/04255, PCT Pub. Date Nov. 8, 1984

PCT Filed May 3, 1984, Ser. No. 700,889

Claims priority, application France, May 4, 1983, 83 07435; Jan. 20, 1984, 84 00867; Feb. 14, 1984, 84 02217

Int. Cl.[4] A63B *71/02*

U.S. Cl. 272—3 **7 Claims**



1. A modular construction assembly for a wall of a court, comprising:

a support framework structure including a plurality of upright members and a plurality of crosspiece members interconnecting consecutive ones of said upright members;

a plurality of modular box-shaped panels each having first and second flanges, said flanges each having first and second longitudinal grooves formed therein, said first and second grooves being transversely oriented with respect to each other, said first and second grooves being aligned with ones of said first and second grooves of adjacent ones of said flanges in adjacent ones of said panels when assembled; and

means for fastening said modular panels to said support framework structure wherein said means for fastening the modular panels to said support framework structure comprises a plurality of connecting members oriented parallel to one another, positioned in said first and second aligned grooves of said flanges of said modular panels and which are connected to said support framework structure and wherein each said connecting member comprises a first head insertable in said support framework structure, a second head positioned in said first aligned grooves, and a rod connecting said first and second heads and positioned in said second aligned grooves.

4,708,337

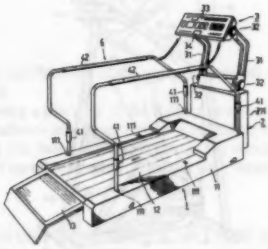
AUTOMATIC TREADMILL

Jia-Ming Shyu, Taipei, Taiwan, assignor to Industrial Technology Research Institute, Hsin-Chu Sheng, Taiwan

Filed Dec. 26, 1985, Ser. No. 813,655

Int. Cl.[4] A63B *23/06*

U.S. Cl. 272—69 **9 Claims**



1. A treadmill having track means for rotating a rotatable belt for a user to stand upon, driving means with a power apparatus connected to said track means for driving said rotatable belt to rotate within a range of speeds ranging from zero to a predetermined maximum and slope adjusting means associated with said track means for inclining said track means, comprising:

a microprocessor controller having stored therein software programs corresponding to a function and a control arrangement for the function, said controller further including data input means for inputting reference control data, data storage means for storing data, and display means for displaying data; and

exercise data detecting means for sensing exercise data and inputting the same to said controller, said exercise data detecting means including means for detecting a user's position and means for inputting data representative of the user's position relative to said controller for adaptively changing the speed of the rotatable belt to keep the user at a certain position on said track means, wherein said slope adjusting means is controlled responsive to said exercise data by said controller to change the slope of said track means, and said driving means is controlled by said controller responsive to said exercise data to vary the speed of rotation of said rotatable belt.

4,708,338

STAIR CLIMBING EXERCISE APPARATUS

Lanny L. Potts, 6011 N. Yorktown, Tulsa, Okla. 74126

Filed Aug. 4, 1986, Ser. No. 892,101

Int. Cl.[4] A63B *23/04*

U.S. Cl. 272—70 **6 Claims**

1. An exercise apparatus that simulates stair-climbing for a user which comprises:

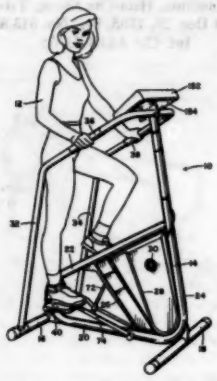
(a) a frame having a base;

(b) a plate on said frame perpendicular to said base;

(c) a right pedal and a left pedal, said pedals being on opposite sides of said plate;

(d) drive system assembly means mounted on said plate in order to sum reciprocating motion into continuous and fluid rotary motion, said drive system assembly means having a right pedal sprocket, a left pedal sprocket and a drive sprocket, wherein said drive sprocket is driven by either said right sprocket or said left sprocket in one direction only and said right and left sprockets are free to overrun in the opposite direction;

(e) independently operating right pedal means and left pedal means being on opposite sides of said plate, wherein said right pedal means oscillates said right pedal between an upper position at rest and a lower, rearward position under the weight of the user and drivingly engages said right pedal sprocket, and wherein said left pedal means



oscillates said left pedal between an upper position at rest and a lower, rearward position under the weight of the user and drivingly engages said left pedal sprocket;

(f) speed increasing transmission means mounted on said plate having an input and an output;

(g) a continuous chain drivingly engaging said drive sprocket and said transmission input;

(h) dynamic brake means mounted on said plate;

(i) a continuous belt engaging said transmission output and said dynamic brake means; and

(j) dynamic brake control and monitor means mounted on said plate whereby the speed of said transmission means, said drive system assembly means and said pedal means are controlled and monitored.

4,708,339

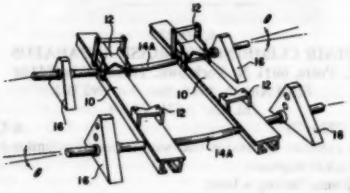
PRE-SKI TESTING AND EXERCISING APPARATUS

James J. Perrine, Chatsworth, Calif., assignor to Questek Corp., Chatsworth, Calif.

Continuation-in-part of Ser. No. 574,724, Jan. 27, 1984, abandoned. This application Feb. 27, 1987, Ser. No. 19,749

Int. Cl.[4] A63B *69/18*

U.S. Cl. 272—97 **18 Claims**



1. An apparatus for pre-ski testing and exercising by a person wearing ski boots, and comprising: first means for fixing said ski boots in a spaced, parallel and inwardly inclined relationship to one another, such that they cannot be moved freely independently of one another in either a vertical or horizontal plane; and second means defining axial fulcrums displaced outward a fixed distance from the center of weight of the body of the person on both sides of the body and in front and behind the body for allowing the person to forcibly lift the front or rear or either side of said first means against the body weight of the person, and rock said first means from side-to-side about said fulcrums, and rock said first means forward and backwards about said fulcrums.

4,708,340

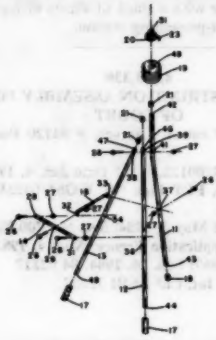
EXERCISE AND SPORTING DEVICE

Nino D'Agosta, 1316 Hickory St., Omaha, Nebr. 68108

Filed Mar. 22, 1982, Ser. No. 360,442

Int. Cl.[4] A63B *13/00*

U.S. Cl. 272—117 **4 Claims**



1. An exercise device for strengthening one's grip, wrist, arms and back, comprising,

a frame means including first, second and third elongate members each having upper and lower ends, said three elongate members being joined together adjacent the upper ends thereof, said lower ends extending outwardly and downwardly from said joined upper ends, and terminating in three support points,

a weight attachment means comprising a bent end portion at the upper end of said first elongate member, said bent end portion extending upwardly in upright relation from said joined upper ends,

said second and third elongate members being of equal length, which length is between two and four feet,

a plurality of brace means interconnecting said three elongate members, said brace means being positioned intermediate the opposite ends of said elongate members,

a plurality of removable disc weights having center openings therein, said discs being supported in stacked relation on said joined upper ends of said second and third elongate members with said bent end portion extended through said center openings, and

a removable weight securement means fastened to said bent end portion above said disc weights to retain said weights thereon,

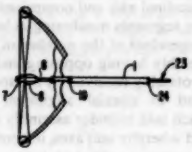
said disc weights being removably positioned on said bent end portion to thereby accommodate incremental weight variations for a generally 90° pivotal movement of the device about an axis extended between the support points or two elongate members by various users having only a single handed grip on one of said two elongate members adjacent the support point thereof.

4,708,341

ARCHERY/PRACTICE EXERCISE DEVICE AND ATTACHMENTS THEREFOR

Theodore G. Paraskevakos, Melbourne, Fla., assignor to Indoor Archery International Corporation, Melbourne, Fla.

Division of Ser. No. 584,880, Feb. 29, 1984, Pat. No. 4,623,145.
This application Nov. 6, 1986, Ser. No. 927,513
Int. Cl.[4] F41B 5/00
U.S. Cl. 272—135 14 Claims



9. An air responsive attachement device and target for use with a cylinder having an orifice at a forward end thereof through which air is forced out from the cylinder, the air responsive attachment device comprising a coupling member for coupling to the cylinder, the coupling member having a housing for battery means, the battery means being connected to a switch means having of closed contacts, a pair of connected parallel extending cylinder members, one of the pair of cylinder members having a closed forward end and adapted to be mounted in overlying relation with respect to the cylinder for sliding movement with respect to the forward end of the cylinder, the other of the pair of cylinder members housing a light emitting means electrically connected to the switch means by an extension member, the other cylinder member having an aperture at the forward end through which light of the light emitting means is projected and at the rear end thereof a projection arranged for contacting one of the contacts of the switch means so as to maintain the normally closed contacts in an open position, and biasing means for biasing the other of the cylinder members into a rest position where the projection maintains the contacts of the switch means in the open position so that a circuit of the battery means to the light emitting means is not completed and the light emitting means is not energized, whereby upon air being forced out of the orifice the one cylinder member and the other cylinder member are caused to move in the forward direction overcoming the force of the biasing means so that the projection of the other cylinder member moves away from the one contact of the switching means enabling the contacts of the switching to close and complete the circuit with the light emitting means becoming energized and projecting a beam of light through the aperture which appears as a light spot on the target.

4,708,342

BALANCING GAME DEVICE AND METHOD

Michael S. Davis, 6256 Rogers Park Pl., Cincinnati, Ohio 45213

Filed Jan. 13, 1986, Ser. No. 818,200
Int. Cl.[4] A63F 9/00
U.S. Cl. 273—1 GF 4 Claims

1. A puzzle-type amusement device comprising, in combination:

(a) a rigid pivotal support member;

(b) a plurality of balance members, each having a rigid elongated portion of substantially circular cross section with an enlarged head portion thereon;

(c) a substantially planar storage means including recessed retention slots for said support member and said balance members; and,

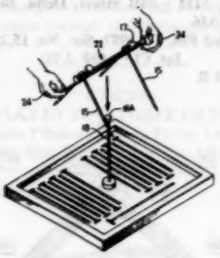
(d) a base carried by and protruding from said storage means and including a means for accepting a first end of the support member.

4. A method for forming an amusement device comprising the steps of:

providing a rigid support member having a first end and a second end;

providing a base member including a receiving slot for accepting the first end of the support member;

providing a plurality of rigid balance members;



disposing the first end of the support member in the receiving slot;

interweaving a plurality of the balance members about a first of the balance members to form a balancing structure; and,

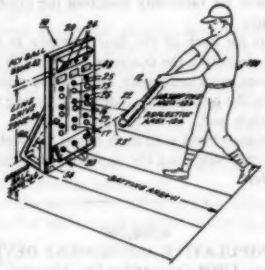
balancing the balancing structure on the second end of the support member remote from the base member.

4,708,343

APPARATUS FOR BASEBALL BATTING PRACTICE

Louis J. D'Ambrosio, 10 Willaway, Massapequa, N.Y. 11758

Filed Nov. 1, 1985, Ser. No. 793,891
Int. Cl.[4] A63B 71/02
U.S. Cl. 273—26 R 19 Claims



1. Baseball batting practice apparatus including:

a plurality of spaced light-emitting devices actuable to simulate a pitched ball by directing respective outgoing beams of light in a first direction to a batting zone;

said batting zone including a front facing said light-emitting devices and a rear opposite said front;

a bat having a light-reflecting portion;

a plurality of pickup means disposed forward of said batting zone to receive reflected light from said light-reflecting portion of said bat while the latter is swung in a generally forward direction through said batting zone by a player and intercepts one of said outgoing beams of light;

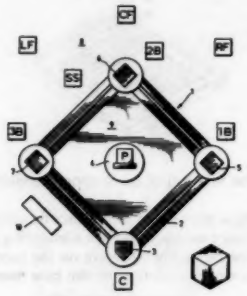
said forward direction being opposite said first direction;

said pickup means being divided into a line drive zone, a ground ball zone disposed below said line drive zone and a fly ball zone disposed above said line drive zone;

first means to actuate said light-emitting devices in a plurality of different groups and control the light emitting devices within each of said groups so that they are activated

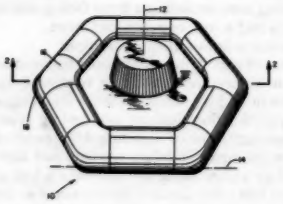
in a predetermined sequential-time relationship to simulate speeds and trajectories for differently thrown balls; and second means to indicate which of said zones contains a pickup means that has received reflected light.

4,708,344
BASEBALL GAME APPARATUS
Hugh J. Wyatt, 5111 - 58B Street, Delta, British Columbia, Canada V4K 3J6
Filed Feb. 17, 1987, Ser. No. 15,213
Int. Cl.[4] A63F 3/00
U.S. Cl. 273—93 R **3 Claims**



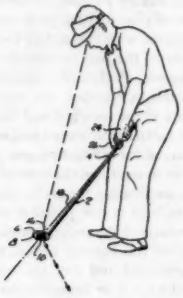
1. A game apparatus for simulating the game of baseball comprising:
(a) a game board having a representation of a baseball diamond depicted thereon;
(b) a plurality of individual pieces adapted for movement about the board to represent the position of runners on the base pads;
(c) an element for randomly selecting the pitch thrown by the pitcher;
(d) elements for each of the four basemen in the field for randomly selecting the outcome of a play at that base;
(e) an element associated with each of the possible pitches thrown by the pitcher for randomly selecting the outcome of said pitch; and,
(f) elements associated with each of the four fielding players for randomly selecting the outcome of a hit directed to that fielder.

4,708,345
MANIPULATIVE AMUSEMENT DEVICE
David B. Ayers, 13908 Cravenridge Dr., Houston, Tex. 77083
Filed Jan. 6, 1986, Ser. No. 816,450
Int. Cl.[4] A63F 9/08
U.S. Cl. 273—153 S **20 Claims**



1. A manipulative amusement device comprising:
an upper plate;
a lower plate parallel to and in coaxial alignment with said upper plate and rotatable relative to said upper plate;
each plate having a common centerpoint and including a plurality of openings on the outer periphery thereof alignable in vertical registry upon said relative rotation;
each plate further including a collar piece disposed on either side of each opening whereby when said openings are in said vertical registry, mating pairs of said collar pieces define a plurality of collar members each having a pair of recesses;
a plurality of cylinder assemblies each formed about a respective longitudinal axis and comprised of an even number of cylinder segments numbering at least six, said number being independent of the number of said plates; and
each said assembly having opposing end disks, each said disk being rotatably received by a respective one of said recesses and in coaxial alignment with said axis whereby each said cylinder assembly is rotatable about said axis and whereby said axes, in combination, circumscribe said common centerpoint.

4,708,346
GOLF CLUB WITH ALIGNMENT DEVICE
Milton R. Pierce, and Elizabeth C. Pierce, both of 333 Club Manor Dr., Sun City Center, Fla. 33570
Filed Dec. 9, 1986, Ser. No. 939,637
Int. Cl.[4] A63B 69/36, 53/04
U.S. Cl. 273—164 **3 Claims**



1. A golf club having a swing aligning device for assisting a golfer in positioning his hands upon the club and guiding his swing of the club to a golf ball, said club comprising
a shaft having a longitudinally extending hand grip affixed at one end thereof and a club head affixed at the opposite end thereof;
said club head including a visible stripe on the ball contacting face thereof, said stripe extending through the desired ball contacting area of said club face and being aligned such that, when said club head is in its ball addressing position on a playing surface and is viewed horizontally from directly ahead of said club face, a plane including the viewer's eye and a lengthwise extension of said stripe extends through a point generally midway the upper and lower ends of said shaft hand grip.

4,708,347
CLUB-HEAD
Masashi Kobayashi, Matsudo, Japan, assignor to Maruman Co., Ltd., Tokyo, Japan
Filed Apr. 22, 1986, Ser. No. 854,626
Claims priority, application Japan, Apr. 27, 1985, 60-089908
Int. Cl.[4] A63B 53/04
U.S. Cl. 273—171 **8 Claims**

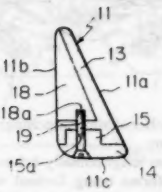
1. A club-head for a golf club, including a hitting portion having a front surface for striking a golf ball, a back surface, a

sole surface, a top edge and heel and toe ends, and a hosel portion extending obliquely upward from said heel end of said hitting portion, said hitting portion comprising:

a main body made of fiber-reinforced plastic for defining at least said front and back surfaces of said hitting portion;

a metal sole member integrally fixed at an upper surface thereof to said main body along the underside of said main body for defining said sole surface of said hitting portion;

a weight member made of heavy material and arranged in said main body behind said front surface of said hitting portion and formed separately from said sole member, said weight member having a top edge and front, back and bottom surfaces, said top edge of said weight member being located in the vicinity of said top edge of said hitting



portion, said bottom surface of said weight member being located apart from said upper surface of said metal sole member so that a part of said main body is disposed between said weight member and said metal sole member, said front surface of said weight member extending substantially in parallel to said front surface of said hitting portion so that said main body has substantially a constant thickness between said front surface of said hitting portion and said front surface of said weight member;

at least one or more connecting members, rigidly connecting said weight member with said metal sole member, formed separately from at least one of said sole member and weight member and extending between said bottom surface of said weight member and said upper surface of said metal sole member through said main body.

4,708,348

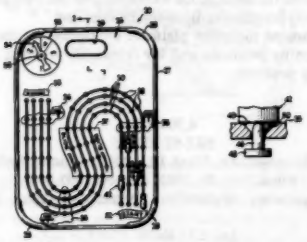
PORTABLE GAME WITH CAPTIVE PARTS

John V. Zaruba, Chicago, Ill.; Steven P. Hanson, Richfield, Minn., and Wayne A. Kuna, River Forest, Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 5, 1986, Ser. No. 826,112

Int. Cl.[4] A63F *3/00*

U.S. Cl. 273—246 **5 Claims**



1. A portable game comprising:

a generally planar bottom surface;

a playing surface spaced from the bottom surface and having a predetermined thickness;

pieces movable by a player during play of the game;

the playing surface including a slot receiving the player movable pieces;

a slot extending through the thickness;

means capturing the pieces against removal from playing surface;

the slot including discreet spaced apart positions along the path defined by truncated conical depressions; and the pieces including a stem extending therefrom, said stem having an enlargement at each end thereof and a truncated conical section located therebetween that fits into the depression.

4,708,349

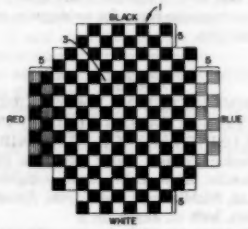
CHESS FOR PLAY BY TWO, THREE OR FOUR PERSONS

Dan Shomer, Lake Pillsbury Ranch, Potter Valley, Calif. 95469

Filed Oct. 29, 1985, Ser. No. 792,362

Int. Cl.[4] A63F *3/02*

U.S. Cl. 273—261 **2 Claims**



1. A chess game for play by two, three, or four persons comprising:

a checkerboard having one hundred and forty-four squares arranged in a central playing array, said central playing array having twelve bilaterally arranged rows of twelve squares per row;

an additional peripheral playing area further comprising four staging arrays, each of said staging arrays having eight bilaterally arranged rows of two squares per row, one of each of said staging arrays being longitudinally centered on and contiguous with one of each of the four sides of said central playing array and wherein said staging arrays include a staging array having squares of two different colors both of which colors are different from those of a second staging array; and

four sets of playing pieces, said sets being distinguishable one from another and comprising the following pieces per set:

Eight pawns;

Two rooks;

Two knights;

Two bishops;

One queen; and

One king.

4,708,350

MAGNETIC LIQUID SEAL WITH MAGNETIZED DEFORMABLE MAGNET

Muneo Mizumoto, Tsuchiura; Hiroshi Inouye, Ibaraki, and Hiroyuki Kitsunai, Tsuchiura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 18, 1986, Ser. No. 886,813

Claims priority, application Japan, Jul. 24, 1985, 60-161818; May 2, 1986, 61-100945

Int. Cl.[4] F16J *15/16, 15/40*

U.S. Cl. 277—80 **18 Claims**

1. A magnetic liquid seal comprising:

a first member having a groove provided at a surface thereof;

a second member arranged for rotation with respect to said first member at least in the region of said groove;

a deformable magnetized magnet being disposed in said groove; and

a magnetic liquid being entrapped at a gap defined between said first and second member proximate to said deformable magnetized magnet;

wherein said deformable magnet is magnetized so as to provide at least one pair of opposite polarity poles arranged so that an imaginary line intersecting said pair of poles extends in a direction substantially parallel to a surface of said second member, said deformable magnet providing a magnetic force for entrapping said magnetic liquid at said gap.

4,708,351

SEALED JOINT INCLUDING WATER-ABSORPTIVE, WATER-SWELLING COATING AT JOINT INTERFACE SITE FOR USING LEAKAGE TO REPAIR LEAKS

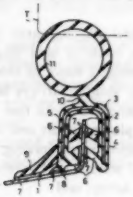
Masanori Midooka; Takashi Kubo; Atsunobu Fujikawa, and Masanori Motoda, all of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd, Nishikasugai and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Sep. 16, 1985, Ser. No. 776,604

Claims priority, application Japan, Sep. 17, 1984, 59-194149; Sep. 17, 1984, 59-194150; Sep. 17, 1984, 59-194151

Int. Cl.[4] F16J *15/10*

U.S. Cl. 277—184 **11 Claims**



1. A sealed joint, comprising:

a first member;

a second member;

one of said first and second members having a portion fitted into a recess provided in the other of said first and second members;

one of said first and second members on said portion and the other of said first and second members in said groove constituting a seal for normally sealing with the respective said other of said first and second members in said groove and said one of said first and second members on said portion for preventing infiltration of rain and washing water from one side of said sealed joint to an opposite side of said sealed joint;

a layer of water-swelling material, which swells upon absorption of water to enhance sealing, being provided between said first and said second members at least partly within said groove, this layer being present in a sufficient quantity to re-establish a seal between said first and second members should said seal for normally sealing fail and leak water so that such water contacts said layer of water-swelling material and causes said layer to swell.

4,708,352

PLASTIC ADJUSTABLE ROLLER SKATE

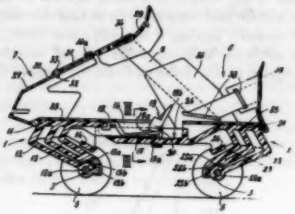
Paul Vullierme, Aix les Bains, France, assignor to Etablissements Vullierme S.A., Rumilly, France

Filed Jul. 15, 1986, Ser. No. 885,855

Claims priority, application France, Jul. 18, 1985, 85 11206

Int. Cl.[4] A63C *17/02*

U.S. Cl. 280—11.26 **8 Claims**



1. An adjustable roller skate comprising:

a front toe platform;

a rear heel platform longitudinally behind the toe platform, one of the platforms being formed with a longitudinal extension telescoping in the other platform;

respective front and rear axles carried on the platforms;

a respective angled outer arm on each platform having a lower end carrying the respective axle, the arms being limitedly flexible for limited vertical movement of the respective axles;

a respective angled inner arm on each platform lying within and above the respective outer arm and having a lower end normally spaced vertically above the lower end of the respective outer arm;

respective abutments on the platforms spaced above the lower ends of the respective inner arms and each engagable with the lower end of the respective inner arm on upward deflection of same;

respective front and rear wheels carried on the axles;

respective toe and heel retainers on the platforms shaped to engage around the toe and heel of a foot on the skate;

at least one strap engaged with the retainers and engageable over the foot in the retainers to secure same in place therein;

a longitudinal row of teeth formed on the extension;

an elastic tongue longitudinally nondisplaceable on the other platform and formed with teeth, the tongue being displaceable between a locking position with its teeth engaged in the teeth of the extension and thereby securing the two platforms against relative longitudinal displacement and a freeing position with its teeth out of engagement with the teeth of the extension and the two platforms relatively longitudinally displaceable; and

latch means on the other platform for displacing the tongue between its positions and for releasably holding it in the locking position.

4,708,353

SKI-SLEDGE

Jean-Yves Evequoz, Av. Vinet 12, 1004 Lausanne, Switzerland

Filed Nov. 26, 1985, Ser. No. 801,841

Claims priority, application Switzerland, Dec. 3, 1984, 5736/84

Int. Cl.[4] B62B *13/02*

U.S. Cl. 280—16 **15 Claims**

1. A ski-sledge including:

two rear skis;

a front ski pivotably arranged around a steering axis and connected with steering means;

two guide rods, each of which is connected at one end thereof with one of said rear skis through first pivot

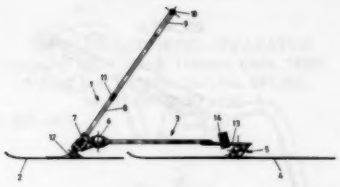
means, and both said guide rods being connected at the other ends thereof jointly with said steering means through second pivot means;

each of said guide rods being elastically pivotable relative to said steering means in a plane which is substantially parallel to said steering axis;

each of said rear skis being elastically pivotable relative to the associated guide rod in a plane which is substantially parallel to said steering axis;

said guide rods and rear skis being arranged substantially rigid in relation to each other in a plane which is substantially parallel to the driving ground plane of the ski-sledge;

said first and second pivot means comprising first and second annular spring means, respectively;



said first annular spring means being elastically deformable in a radial direction as well as in a circumferential direction with respect to the axis of said first annular spring means;

said second annular spring means being substantially rigid at least in a radial direction;

each of said first and second annular spring means comprising a closed annular spring member which is elastically deformable in the plane thereof, and first and second connection members arranged within said annular spring member and connected therewith, and a support member extending between said first and second connection members.

4,708,354

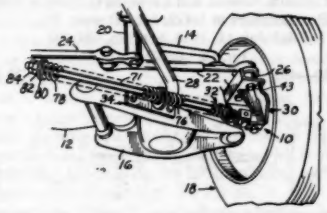
VEHICLE STEERING STABILIZER

George B. Moore, 7501 E. 80th South, Tulsa, Okla. 74133

Filed Nov. 6, 1986, Ser. No. 927,571

Int. Cl.[4] B62D *7/08*

U.S. Cl. 280—94 **5 Claims**



1. In a vehicle front suspension system having an upper and a lower control arm assembly connecting a steerable wheel assembly supporting steering knuckle to a frame cross member for vertical movement of the wheel assembly relative to the frame cross member between an unsprung and a sprung condition and horizontal turning movement of the wheel assembly about a generally vertical turning axis and having a steering control connected by steering rods with a generally horizontal forwardly extending rigidly connected steering knuckle arm, the improvement comprising:

control bracket means rigidly secured to said steering knuckle arm and having a clevis portion remote from the steering knuckle arm and disposed forwardly of the turning axis,

said control bracket means including a right angle member having one flange longitudinally underlying in contiguous contacting relation said steering knuckle arm and having an adjoining upstanding flange adjacent the steering knuckle arm opposite the wheel assembly and having an aperture adjacent one end of the underlying flange nesting the steering rod connected end portion of said steering knuckle arm;

clamp means connecting the other end portion of the angle underlying flange to the steering knuckle arm;

bearing bracket means secured to the forwardly disposed surface of the lower control arm including a vertical forwardly projecting horizontally apertured spring divider;

spring assembly means including a shaft supported intermediate its ends by said bearing bracket means for longitudinal reciprocating movement of the shaft relative to the bearing bracket means,

said spring assembly means including a pair of compression springs respectively surrounding opposing end portions of said shaft on opposite sides of its bearing supported position;

spring tension adjusting means on the respective end portions of said shaft; and,

pivoting joint means connecting one end of said shaft with the control bracket arm clevis portion for a universal joint type action of the clevis portion relative to the longitudinal axis of the shaft.

4,708,355

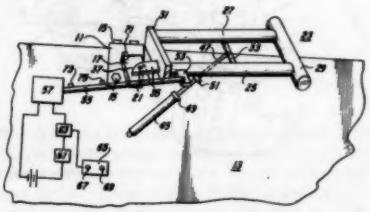
HIDEAWAY VEHICLE STEP

James Tiede, 651 80th St., Niagara Falls, N.Y. 14304

Filed Aug. 18, 1986, Ser. No. 897,501

Int. Cl.[4] B60R *3/02*

U.S. Cl. 280—166 **8 Claims**



1. A pivotally mounted vehicle step assembly for use on high clearance vehicles, said step unit having an extended position wherein the step unit provides access to the vehicle and a retracted position wherein the step is stored adjacent the vehicle underbody comprising:

(a) an anchoring means rigidly secured to a rigid stationary part of the underside of said high clearance vehicle,

(b) a step unit pivotally attached to said anchoring means, said step unit comprised of:

(1) a pair of rigid, spaced apart, parallel step frame members,

(2) a bottom treadle positioned between and across the bottom portion of said step frame members,

(3) a top support plate positioned between and across the top portion of said frame members,

(4) a cross-support piece positioned between and across an intermediate portion of said frame members, and,

(5) a single vertically extending connector tab positioned atop said top support plate for pivotally attaching said step unit to a pivot point on said anchoring means,

(c) a bracing means to brace said step unit, when said step unit is in an extended position, against said vehicle under-

side, one end of said bracing means pivotally attached to said vehicle underside at a point below and in substantial alignment with the pivot point of said step unit, and one end of said bracing means pivotally attached at an intermediate portion of said cross-support piece on said step unit, said bracing means comprising:

(1) a cylinder having a connecting rod therein, said connecting rod moveable freely within said cylinder,

(2) said cylinder and said connecting rod having movement limiting means thereon to limit the amount that the connecting rod can enter said cylinder, and

(3) said movement limiting means preventing further entry of the connecting rod in said cylinder when the said step unit is in an extended position,

(d) an actuating means to move said step unit to and from said extended to said retracted position, and

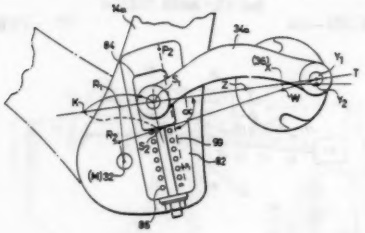
(e) a control means to activate said actuating means.

4,708,356

HUMAN POWERED VEHICLES AND MECHANISM PARTICULARLY USEFUL THEREIN

Shmuel Levavi, Keren Kayemet Leyisrael St. 18, Givatayim, Israel

Filed Dec. 16, 1985, Ser. No. 809,387
Int. Cl.[4] B62M *1/08, 1/10, 1/12*
U.S. Cl. 280—255 **13 Claims**



1. A human powered vehicle including a chassis, foot pedals operated by the occupant, a drive shaft, a driven wheel driven by the drive shaft, and a motion converter mechanism coupling said foot pedals to said drive shaft, comprising:

a foot pedal lever pivotably mounting one end of said foot pedals to the vehicle chassis;

a slide block slidably mounted on said foot pedal lever adjacent to but spaced from said one end thereof;

a crank arm pivotably mounted at one end to said slide block and pivotably and eccentrically mounted at the opposite end to said drive shaft to and through a dead-center line passing through the pivot points of the crank arm and the axis of the drive shaft;

a spring disposed in the space between said slide block and said one end of the foot pedal lever and urging said slide block to a home position away from said one end of the foot pedal lever;

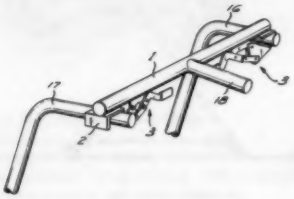
and constraining means for constraining said slide block to slide towards said one end of the foot pedal lever along a line which forms an angle of less than 90° with the dead-center line of said crank arm with respect to said drive shaft when the slide block is in its home position, such that a force applied to said foot pedal lever when the crank arm is in its dead-center position produces a component of force effective to move said slide block away from its home position and towards said one end of the foot pedal lever against the action of said spring, thereby moving said crank arm away from its dead-center position with respect to said drive shaft.

4,708,357

ADAPTOR HANDLE

Mavis Soderbaum, Prospect, Australia, assignor to Gerard Berkowitz, Australia and Jeffrey Stewart, Laguna Hills, Calif., a part interest

Filed Mar. 31, 1986, Ser. No. 846,304
Int. Cl.[4] B62B *3/00*
U.S. Cl. 280—289 H **9 Claims**



1. An improved adaptor handle for wheeled vehicles and the like having a pair of handlebars with a pair of spaced apart rearwardly extending handles formed thereon for application of propulsion forces and steering comprising:

an arm member extending directly across said pair of spaced apart handles of the vehicle;

quick-release clamp means, mounted adjacent opposite ends of said arm member, for releasably clamping by hand-generated squeezing pressure said arm member to said pair of handles of the vehicle; and

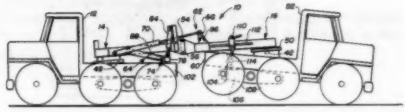
a single hand grip member, centrally mounted to the arm member and extending rearwardly from said arm member in a direction substantially parallel to and at the same level with said the pair of handles and adapted to be grasped by the hand of a user.

4,708,358

DISABLED TRUCK TRACTOR RECOVERY UNIT

Roland P. Gehman, Stevens, and Raymond G. Martin, East Earl, both of Pa., assignors to MGS, Inc., Denver, Pa.

Filed Jul. 11, 1986, Ser. No. 884,703
Int. Cl.[4] B60P *3/12*
U.S. Cl. 280—402 **20 Claims**



1. A recovery unit for use by one truck tractor in towing another truck tractor wherein each tractor has a fifth wheel, said recovery unit comprising:

(a) first frame means adapted to be coupled to a fifth wheel of a towing tractor;

(b) second frame means adapted to be coupled to a fifth wheel of a towed tractor, said second frame means being mounted to said first frame means for pivotal movement relative thereto between a stored condition wherein it is disposed adjacent said first frame means and incapable of being coupled to the fifth wheel of the towed tractor and

an extended condition wherein it forms an extension of said first frame means and is capable of being coupled to the fifth wheel of the towed tractor; and

(c) an actuating mechanism being selectively operable to pivotally move said second frame means relative to said first frame means between said stored and extended conditions, said actuating mechanism also being selectively operable to pivotally move said second frame means to and from an erected position relative to said first frame means once said second frame means has been first moved to its extended condition and coupled to the fifth wheel of the towed tractor, said pivotal movement of said second frame means to its erected position causing a portion of a frame of the towed tractor to be placed in a raised towing position.

4,708,359

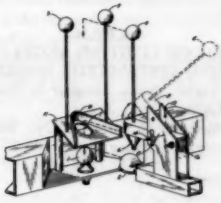
TRAILER HITCHING APPARATUS

Duke Davenport, 703 N. Birch, Owasso, Okla. 74055

Filed Dec. 29, 1986, Ser. No. 947,403

Int. Cl.[4] B60D *1/06*

U.S. Cl. 280—477 **1 Claim**



1. An improved trailer hitching apparatus comprising:

a trailer tongue adapted to be attached to a trailer;

means attached to the front of said tongue for selectively extending over and holding a ball;

a loading arm disposed above said tongue;

bracket means for operatively attaching said loading arm to said tongue;

means attached to said bracket means for operatively pivotally attaching a front portion of said loading arm to said bracket means;

means operatively attached to said bracket means for holding said loading arm in either a substantially horizontal position or a position wherein the front of said loading arm is a substantial distance above the rear end thereof;

loading pin means disposed on the front underside of said loading arm, said loading pin means being frusto-conical with a smaller portion thereof extending downwardly from a larger portion thereof;

a trailer sighting rod attached at the bottom thereof to a front portion of said loading arm and having an upper end;

first enlarged means at the top of said sighting rod for viewing from the driver's seat of a vehicle;

a housing adapted to be attached to a vehicle;

a ball attached at the bottom thereof to said housing;

a loading plate attached at a front end thereof to said housing and disposed above said ball, said loading plate being lower at the rear thereof than at the front;

opening means disposed centrally through said loading plate for receiving said loading pin means therein;

guide means attached to the top of said loading plate and extending around said opening means to a rear portion of said loading plate, said guide means being wider at the rear thereof than at the front thereof where it surrounds the opening means, for guiding the loading pin into said opening means;

a first vehicle sighting rod operatively attached at the bottom thereof to said loading plate on one side of said opening means;

second enlarged means at the top of said first vehicle sighting rod for viewing from the driver's seat of the vehicle;

a second vehicle sighting rod operatively attached at the bottom thereof to said loading plate on the other side of said opening means; and

a third enlarged means at the top of said first vehicle sighting rod for viewing from the driver's seat of a vehicle whereby the driver of a vehicle can guide the vehicle so as to position the second and third enlarged means operatively attached to the vehicle hitch housing to each side respectively of the first enlarged means, which is operatively attached to the trailer tongue, thereby causing the loading pin means to drop into the opening means and the ball holding means to simultaneously drop down over the ball.

4,708,360

SKI BRAKE

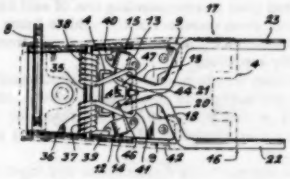
Henri Peyre, Nevers, France, assignor to Ste LOOK, Nevers, France

Filed Jul. 15, 1986, Ser. No. 885,704

Claims priority, application France, Jul. 26, 1985, 85 11439; Mar. 25, 1986, 86 04224

Int. Cl.[4] A63C *7/10*

U.S. Cl. 280—605 **8 Claims**



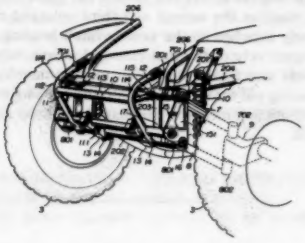
1. In a ski brake comprising an operating pedal pivotably mounted on a pin for pivotal movement about said pin between raised and lowered positions; means for mounting said pin on the upper surface of a ski; a pair of braking arms each having a first end pivotally mounted on said operating pedal for pivotal movement about an axis, a second end adapted to receive a braking element. and an intermediate, inwardly bent portion having a horizontally disposed region adapted to slide along said mounting means responsive to conjoint pivotal movement of said operating pedal about said pin and said first ends about their respective axes; each said second end extending obliquely relative to the said pivotal axis of its corresponding said first end, whereby said conjoint pivotal movement from said lowered position to said raised position of said operating pedal displaces said second ends of said braking arm pair downwardly and outwardly relative to said upper surface of said ski; and elastic means urging said operating pedal toward said raised position; the improvement in which said elastic means comprises a single spring having two ends coiled around a supporting shaft extending parallel to said pin and having extensions bearing against a lower face of said operating pedal, said two ends being interconnected by a central loop bearing against said intermediate portions of said braking arm pair to exert on said braking arm pair a thrust urging said operating pedal toward its said raised position and maintaining said horizontally disposed regions in sliding contact with said mounting means.

4,708,361

SUSPENSION FOR OFF-ROAD MOTOR VEHICLES

Minoru Takada, Tokyo, and Toshio Tsuchiya, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 26, 1986, Ser. No. 833,810
Claims priority, application Japan, Feb. 26, 1985, 60-36802
Int. Cl.[4] B60G 3/20
U.S. Cl. 280—663 3 Claims



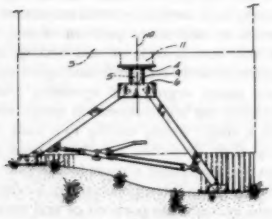
1. A suspension for an off-road motor vehicle, comprising:
a vehicle frame including upper and lower front cross members extending transversely, each cross member having extensions from opposite ends thereof, and a front bumper;
front wheels;
a trailing arm suspension for suspending said front wheels from said vehicle frame;
said trailing arm suspension mechanism including two pairs of upper and lower swing arms, each arm having, on the front end thereof, a tubular boss member directly pivotally fitted over a corresponding one of said extensions of said front cross members of the vehicle frame and a rear end on which a corresponding one of said front wheels is steerably supported;
a pair of joint members, each having attachment holes into which end portions of said extensions outwardly projecting out of said boss members are fitted for connection between said front ends of a corresponding pair of said arms; and
said front bumper being connected to said front cross members and having an additional cross member extending between said pair of joint members.

4,708,362

STABILIZER DEVICE

Warren V. Raetz, 180 Thompson Rd., Grand Junction, Colo. 81503

Continuation of Ser. No. 846,610, Mar. 31, 1986. This application Apr. 20, 1987, Ser. No. 40,728
Int. Cl.[4] B60S 9/02
U.S. Cl. 280—763.1 18 Claims



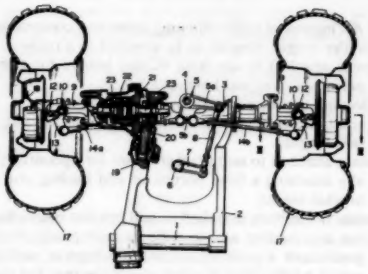
1. A stabilizer device for stabilizing fifth wheel recreational vehicles relative to a support surface where the vehicle has a connecting pin extending downardly from a strike plate mounted on the underside of the vehicle overhang said stabilizer device comprising:
(a) a compensator having a support axis comprising a rigid body incorporating a receptacle open at at least one end and at least in part defined by a bearing surface where said bearing surface lies in a plane intersecting said axis for flush engagement with said strike plate and adapted to receive said connective pin;
(b) a pair of elongated leg members pivotally mounted at their upper-ends to said compensator for rotation relative thereto where the pivots of said leg members are laterally and oppositely spaced from said support axis and adapted to permit movement of the compensator in a transverse direction such that said compensator may move into coaxial alignment with said connector pin thereby permitting flush engagement of said bearing surface with said strike plate under any terrain conditions; and,
(c) uni-directional tensioning means interconnecting said leg members at a distance from their respective pivots for drawing said legs toward one another thereby causing said bearing surface to bear in compression against the strike plate.

4,708,363

MECHANISM FOR LIMITING ANGULAR MOVEMENT IN STEERING SYSTEMS FOR MOTOR VEHICLES

Koichi Hata, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 21, 1986, Ser. No. 888,734
Claims priority, application Japan, Jul. 19, 1985, 60-159732
Int. Cl.[4] B60G 1/00
U.S. Cl. 280—771 2 Claims



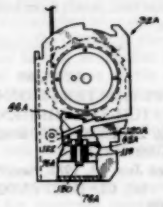
1. A steering system for a motor vehicle, comprising:
a steering handle;
a pair of steerable wheels;
a pair of knuckles on which said steerable wheels are rotatably supported, each said knuckle having a pair of front and rear stopper portions;
a pair of knuckle supporting members on which said knuckles are angularly movably supported;
a pair of tie rods operatively coupled between said steering handle and said knuckles for transmitting angular movement of said steering handle to said knuckles;
a pair of stoppers mounted on said knuckle supporting members, respectively, and engageable with said stopper portions of said knuckles, respectively, for limiting angular movement of said knuckles; and
said stopper and said knuckles being relatively positioned such that when said steering handle is turned through a maximum angle, there is a clearance kept between the knuckle coupled to the tie rod being pushed and the stopper associated therewith.

4,708,364

SEAT BELT RETRACTION APPARATUS INCLUDING AN INERTIA SENSOR

Gerald A. Doty, Crown Point, Ind., assignor to Gateway Industries, Inc., Olympia Fields, Ill.

Filed Apr. 11, 1986, Ser. No. 835,604
Int. Cl.[4] B60R 21/10
U.S. Cl. 280—806 11 Claims



1. Seat belt retraction apparatus for use in a vehicle having at least one door and a chassis, said apparatus comprising:

a seat belt retractor mechanism including a reel about which the strap of the seat belt is wound and which is adapted to take up and let out said strap,

a locking means moveable into a locking position to prevent said reel from paying out said strap, said locking means being movable between the locking position and a release position in which said reel is free to rotate to pay out or to retract the strap,

inertia sensor mounted on said vehicle and including a piezoelectric device and means for changing the shape of said device so that said device provides an output signal in response to a change in velocity of said vehicle; and

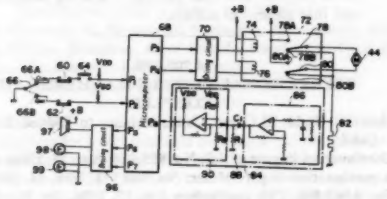
electrical circuit means connected with said inertia sensor and said locking means and comprising control means responsive to operation of said inertia sensor to operate said locking means to its locking position whereby a change in velocity of said vehicle causes a locking of the reel against pay out of the strap.

4,708,365

APPARATUS FOR CONTROLLING SEATBELT SYSTEM

Tasuku Nakano; Kazuo Kouno; Kazunari Hibino, and Masashi Sakurai, all of Aichi, Japan, assignors to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Japan

Filed May 12, 1986, Ser. No. 862,255
Claims priority, application Japan, May 13, 1985, 60-70196[U]; May 13, 1985, 60-70197[U]; May 13, 1985, 60-70198[U]
Int. Cl.[4] B60R 21/10
U.S. Cl. 280—801 19 Claims



9. An apparatus for controlling a seatbelt system in which the distal end portion of a webbing is moved in the longitudinal direction of a vehicle by a motor, thereby allowing said webbing to be automatically fastened to and unfastened from the body of an occupant, which comprises:

(a) a driving circuit connected to said motor for driving it;

(b) motor current detecting means connected to said motor for detecting current flowing through said motor;

(c) a motor overcurrent detecting circuit connected in parallel to said motor current detecting means and adapted to detect an abnormally high motor current and output a motor overcurrent signal; and

(d) motor suspending means for turning OFF said motor for a predetermined period of time through said driving circuit when it receives a motor overcurrent signal from said motor overcurrent detecting circuit after a predetermined period of time has elapsed from the time of starting said motor,

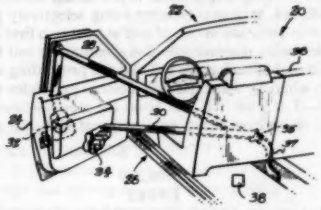
whereby, even when the occupant moves during the movement of the distal end portion of said webbing and said webbing consequently interferes with the occupant's neck or head, it is possible to prevent the occupant from feeling uncomfortable and said motor from being burned out.

4,708,366

SEAT BELT RETRACTION APPARATUS WITH REMOTE INERTIA SENSOR

Gerald A. Doty, Crown Point, Ind., assignor to Gateway Industries, Inc., Olympia Fields, Ill.

Filed Apr. 11, 1986, Ser. No. 835,605
Int. Cl.[4] B60R 21/10
U.S. Cl. 280—803 16 Claims



1. In a seat belt retracting mechanism for mounting on a vehicle having a movable door, the combination comprising:

a seat belt retracting mehanism for mounting on the door including a reel about which a seat belt is wound and which is adapted to rotate to take up or pay out the belt,

a locking means for said reel movable between an unlocked position in which the reel is free to turn to pay out the belt and a locking position in which the reel is prevented from rotating to pay out the belt.

an inertia operating means including an inertia weight operable to move the locking means to its locking position in response to first and second levels of force operation,

said first force level of operation being at a higher force level and being effective when the door is opened and when the door is closed and said second force level being a lower force level,

and electrically operated means including an inertia operated switch means mounted on the vehicle and operable upon sudden acceleration or deceleration of the vehicle for reducing the force level from the higher first level to the lower second level at which the inertia weight and inertia operating means operates the locking means to lock the reel.

4,708,367

SEATBELT ASSEMBLY

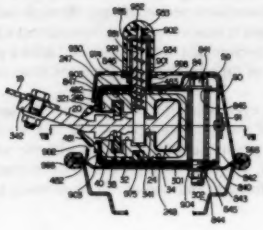
Noritada Yoshitsugu, Aichi, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jul. 7, 1986, Ser. No. 882,463

Claims priority, application Japan, Jul. 12, 1985, 60-107203[U]

Int. Cl.⁴ B60R *21/02*

U.S. Cl. 280—804 **20 Claims**



1. A seatbelt assembly for automatically fastening a restraining webbing around an occupant in a vehicle, comprising:

a guide rail having a longitudinal groove therein, said guide rail being mounted on a vehicle body, said guide rail having at least two first holes communicating with said longitudinal groove, the two first holes being aligned in a longitudinal direction of said guide rail;

a slider being displaceable along the longitudinal groove of said guide rail, the restraining webbing being fastened at one end thereof to said slider; and

an adjustment means having a stop member, said adjustment means being slidably mounted on said guide rail, said stop member being displaceable in the lateral direction of said guide rail, said stop member being selectively positioned so as to protrude in one of said at least two first holes, said slider being displaceable along said guide rail between a front end of said guide rail and the protruding stop member, whereby when the stop member protrudes within one of said at least two first holes the stop member prevents said slider from being displaced past said stop member.

4,708,368

LABEL

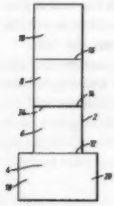
David J. Instance, Guinea Hall, Sellindge, Kent, United Kingdom

Filed May 9, 1986, Ser. No. 861,361

Claims priority, application United Kingdom, May 10, 1985, 8511850

Int. Cl.⁴ A42D *15/00*; B41L *1/20*; B31F *7/00*; B32B *31/00*

U.S. Cl. 283—81 **9 Claims**



1. A label for affixing to a container comprising a longitudinal strip which is divided into a row of four or more panels by three or more corresponding transverse fold lines, the first panel being wider in the transverse direction than the remaining panels and the remaining panels being folded about the respective fold lines to lie over the rear face of the first panel so that two opposing longitudinal edge regions of the rear face of the first panel are left uncovered by the remaining panels and so that at least a portion of the remaining panels other than the second and third panels extends beyond the end edge of the first panel, and a support web to which the two edge regions are adhered such that the remaining panels are disposed between the first panel and the support web and such that the said portion is exposed and can be pulled by a user thereby to pull out at least the last two panels from between the first panel and the support web.

4,708,369

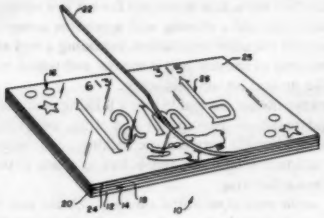
MULTIPLE PLY, ALTERATION-INHIBITED STOCK FOR A MATCH-THE-HIDDEN-INDICIA GAME

Walter G. Greig, Lewiston, N.Y., assignor to Moore Business Forms, Inc., Glenview, Ill.

Filed Jun. 23, 1986, Ser. No. 877,499

Int. Cl.⁴ B42D *15/00, 5/00*

U.S. Cl. 283—108 **6 Claims**



1. A game stock comprising at least one unit, each said unit of game stock comprising:

a base sheet;

a first pattern of indicia printed on one face of said base sheet;

a layer of transparent permanent adhesive material adhered on said one face of said base sheet so as to cover said first pattern of indicia;

a layer of transparent lining material secured on said one face of said base sheet by means of said adhesive material so as to cover said first pattern of indicia;

said base sheet, adhesive material and lining material being so adapted that an attempt to gain access to said first pattern of indicia by removal of said layer of transparent lining material from an overlying, protective relationship thereto, will result in substantial, visually apparent disruption of said first pattern of indicia in relation to said one face;

a cover sheet of opaque material;

a second pattern of indicia printed on one face of said cover sheet; and

a temporary bonding material disconnectably holding said cover sheet on said base sheet in obscuring relationship to said first pattern of indicia.

4,708,370

RECREATIONAL VEHICLE DISCHARGE PIPE COUPLER

Harry V. Todd, El Cajon, Calif., assignor to Toddco, El Cajon, Calif.

Continuation-in-part of Ser. No. 855,924, Apr. 25, 1986, which is a continuation-in-part of Ser. No. 800,171, Nov. 14, 1985, Pat. No. 4,660,860. This application Jun. 17, 1986, Ser. No. 875,451

Int. Cl.⁴ F16L *25/00*

U.S. Cl. 285—12 **23 Claims**

1. A device for coupling a drainpipe to a recreational vehicle discharge pipe fitting of the type having a terminal end portion with a circular periphery and a plurality of locking pins ex-

tending outward radially from the periphery of the vehicle discharge pipe fitting, comprising:

a tubular member having a proximal end and a distal end;

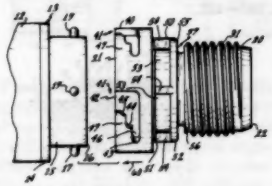
a drainpipe end portion of the tubular member terminating at the distal end, the drainpipe end portion having thread means and a complementary shape and size adapted to engage threadably an end of a helically corrugated drainpipe;

a fitting end portion of the tubular member terminating at the proximal end, the fitting end portion having a complementary shape and size adapted to engage telescopically a terminal end portion of the discharge pipe fitting;

said fitting end portion having an annular interior surface facing said terminal end portion of the discharge pipe fitting, when the discharge pipe fitting is assembled to said fitting end portion;

sealing means for providing a generally fluid-tight seal between said surface and the terminal end portion of the discharge pipe fitting;

slot means defining a plurality of open elongated slots in the fitting end portion for receiving respective ones of the locking pins as the fitting end portion is placed over the



terminal end portion of the discharge pipe fitting and rotated about its axis, each slot extending circumferentially toward the distal end of the tubular member from an open end portion of the slot at the proximal end to a closed end portion of the slot set back from the proximal end, said slot defining means including a plurality of elongated portions of the fitting end portion disposed between the proximal end and respective ones of the slots for engaging a respective one of the locking pins;

said slot means including detent means defining a detent portion in each one of the elongated portions that is disposed intermediate the open end portion and the closed end portion of the slot, for receiving in locking engagement a respective one of the locking pins; and

said slot defining means includes flexing means defining a relief portion of each one of the slots disposed at the closed end portion of the slot, for enabling the elongated portions to yield slightly when abutting the locking pins to accommodate variances in locking pin position, and for causing said sealing means to be drawn into tight engagement sealingly with the terminal end portion of the discharge pipe fitting.

4,708,371

COUPLING FOR A FUEL MANIFOLD

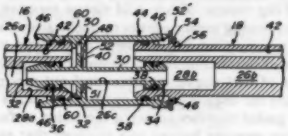
John K. Elsworth, St. Bruno; Ali Nownahal, Mississauga, and Kevin Wilson, Brampton, all of Canada, assignors to Pratt & Whitney Canada Inc., Longueuil, Canada

Filed Apr. 9, 1986, Ser. No. 849,880

Int. Cl.[4] F16L *39/00*

U.S. Cl. 285—13 **7 Claims**

1. A coupling for a fuel manifold defining a fuel line passageway, comprising a tube connector which extends between the ends of two manifold segments to connect the fuel line passageway thereof, the tube connector sealingly fitting within end portions of the fuel line passageway at said ends of respective manifold segments; a retractable sleeve sealingly engaging over said ends of the respective manifold segments, thus enclosing the tube connector and defining a space therewith, locking means provided between the tube and sleeve such that any sliding movement of the sleeve will cause corresponding sliding movement of the tube, the end portions of the fuel line passageway accommodating the tube connector in axial sliding



relationship and the length of the tube connector being such as to allow connecting or disconnecting of the coupling by sliding the sleeve and said tube connector without moving the manifold segments.

4,708,372

CROSS PIPING CONSTRUCTION

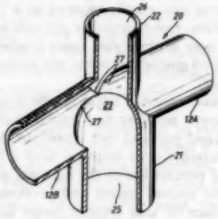
Takahisa Arima; Susumu Ninomiya, both of Yokohama; Yuji Horikawa, Tokyo, and Tadasi Aoki, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 7, 1985, Ser. No. 709,207

Claims priority, application Japan, Apr. 28, 1984, 59-87545; May 8, 1984, 59-91630

Int. Cl.[4] F16L *41/00*

U.S. Cl. 285—150 **6 Claims**



6. A cross-type flow dividing pipe construction comprising:

a main pipe for supplying a liquid,

a pair of first branched pipes branched from an end of said main pipe and having an inner diameter smaller than that of said main pipe and intersecting said main pipe, a second branched pipe having an inner diameter at most equal to that of said first branched pipes and branched from the end of said main pipe so as to intersect said first branched pipe, and

a curved guide surface defined by an inner surface of an interconnection portion between said main pipe said first branched pipes and said second branched pipe contiguous with the inner wall surface of said main pipe for guiding a layer of liquid flowing along and in the vicinity of the inner wall surface of said main pipe to flow into said first branched pipes, said curved guide surface having a cross-section which gradually decreases toward said interconnection portion.

4,708,373

TAPPING SLEEVE OR SERVICE CLAMP FOR USE IN ATTACHING A BRANCH PIPE TO A MAIN IN A FLUID SUPPLY SYSTEM

James C. Morriss, Jr., 140 Northwood, Nash, Tex. 75569

Filed Jan. 12, 1987, Ser. No. 2,418

Int. Cl.[4] F16L *41/00*

U.S. Cl. 285—156 **3 Claims**

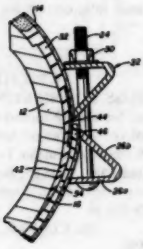
1. A service for providing a branch line to a main conduit comprising:

a pair of semi-cylindrical sleeve members of equal diameter having end edges, one of said sleeve members having a side branch boss member adapted to be aligned with a side opening in the main conduit;

lug means fixed to the opposite ends of said sleeve members, said lug means of one said sleeve member being spaced from the lug means on the opposite sleeve member when the service clamp is installed on the main conduit;

bolt means extending through opposed lug means at opposite ends of said sleeve members and nut means on said bolt means for drawing said opposed lug means together;

a first gasket member adjacent the inside surface of said first sleeve member having end portions that extend well beyond the end edges of said first sleeve member, said gasket



end portions being fully tapered to a feathered edge, so that said first gasket member extends considerably more than half-way around said main conduit and an armour strip of metal embedded in the top surface of each tapered end portion;

a second gasket member adjacent the inside surface of said second sleeve member and having partially tapered but truncated end portions that terminate along the end edges of said second sleeve member with a thickness that is a substantial percentage of the nominal gasket thickness;

whereby said second gasket end portions bear against the outer surface of said armour strips on said first gasket member to provide increased sealing power as said bolt means are tightened.

4,708,374

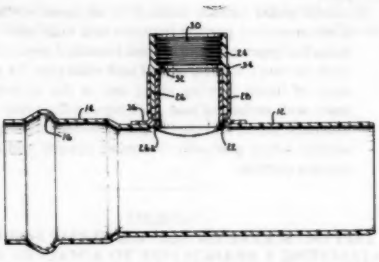
PLASTIC TEE FITTING

Delbert L. Cox, Garden City, Kans., assignor to NACO Industries, Inc., Garden City, Kans.

Filed Jul. 30, 1984, Ser. No. 635,715

Int. Cl.[4] F16L *41/00*

U.S. Cl. 285—156 **8 Claims**



1. A rigid plastic tee fitting comprising:

a main conduit body having a generally cylindrical wall constructed of rigid plastic and defining a flow passage, said body having opposite ends and presenting a generally circular opening in said wall between said ends;

a hollow adapter aligned with said opening and extending outwardly from said wall generally perpendicular to said main body, said adapter being constructed of rigid plastic and having an outer end arranged to connect with another conduit;

a generally cylindrical insert received closely inside of said adapter against an inside surface thereof, said insert being constructed of rigid plastic and being bonded to said body and to the inside surface of said adapter; and

a rigid plastic spout sleeved closely around said adapter against an outside surface thereof, said spout being bonded to said body and to the outside surface of said adapter to secure the adapter to the body in alignment with said opening.

4,708,375

HOSE COUPLING

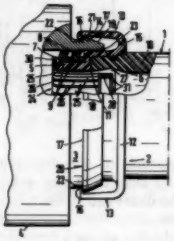
Heinz Sauer, Ronneburg, Fed. Rep. of Germany, assignor to Rasmussen GmbH, Maintal, Fed. Rep. of Germany

Filed Jul. 18, 1986, Ser. No. 888,113

Claims priority, application Fed. Rep. of Germany, Jul. 24, 1985, 3526447; May 12, 1986, 3615904

Int. Cl.[4] F16L *33/22, 37/12*

U.S. Cl. 285—258 **38 Claims**



1. A coupling for use with a first conduit including a deformable first end portion having an external surface and a second conduit having a second end portion with an external porjection, the coupling comprises a tubular connector having a first section extending into said second end portion and a second section having an internal surface arranged to surround the external surface of the first end portion; at least one resilient pallet provided on said connector and releasably engaging said projection to hold said first section against extraction from said second end portion; and means for biasing the first end portion from within so as to maintain the external surface in engagement with said internal surface, said biasing means comprising an annulus of deformable elastic prongs and slots alternating with said prongs, said prongs being surrounded by and having projecting portions in deforming engagement with the first end portion when the external surface of the first end portion is surrounded by said internal surface, said biasing means further comprising a ring surrounded by said annulus and arranged to urge said prongs against the first end portion.

4,708,376

HYDRAULIC COLLET-TYPE CONNECTOR

Charles E. Jennings, Agoura, and Edward E. Thames, Ventura, both of Calif., assignors to Vetco Gray Inc., Houston, Tex.

Continuation of Ser. No. 824,402, Jan. 31, 1986, abandoned. This application Mar. 27, 1987, Ser. No. 32,940

Int. Cl.[4] F16L *37/18*

U.S. Cl. 285—315 **9 Claims**

1. A collet-type connector for connecting one subsea well-type unit, such as a production tree, to another subsea well unit, such as a wellhead, the improvement comprising,

an upper body member adapted to be connected to said one unit,

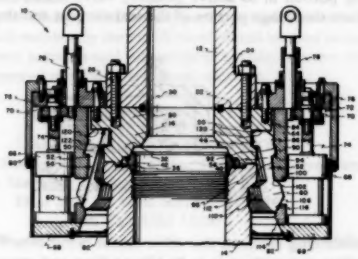
a cam ring surrounding said upper body member, spaced therefrom and movable relative thereto.

collet segments pivotally retained between said cam ring and said upper body member,

camming surfaces on said cam ring,

camming surfaces on said collet segments,

said camming surfaces on said cam ring and camming surfaces on said collet segments forming two sets of camming surfaces which engage sequentially so that with the movement of said cam ring relative to said upper body member



a first of said camming surface sets initially urges said collet segments to member and radially inwardly of said wellhead, and then the second camming surface set further said collet segments into clamping engagement with said wellhead and said upper body member to connect said collet-type connector to said wellhead, said sets of camming surfaces being characterized by having said first set to cease its urging function when said second set functions to thus reduce the power requirement for urging the collet segments into clamping engagement with said wellhead.

4,708,377

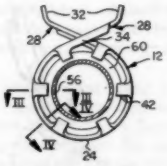
CONTRACTIBLE COUPLING

Ronald M. Hunting, Lawrence, Kans., assignor to Aeroquip Corporation, Jackson, Mich.

Filed Nov. 28, 1986, Ser. No. 935,746

Int. Cl.⁴ F16L *23/00*

U.S. Cl. 285—407 **11 Claims**



5. A radially contractible reusable coupling comprising, in combination, an annular body of resilient sheet metal having first and second ends, first and second lateral edges, an inner surface, an outer surface and a central longitudinal axis, a plurality of deformed fingers having free ends homogeneously defined on said body extending from said lateral edges and deformed approximately 180° toward said body axis and radially spaced from said body inner surface, said free ends being deformed toward said body inner surface and defining a covex arcuate clamping surface defined on each finger adjacent said free end thereof adapted to engage the members being coupled, said fingers on a common lateral body edge being spaced from each other and defining the coupling inside diameter, and body expansion means defined on said body's ends.

4,708,378

ELECTRICALLY CONTROLLED CENTRAL LOCKING DEVICE FOR AUTOMOBILE DOORS

Jürgen Ingenhoven, Velbert, Fed. Rep. of Germany, assignor to Kiekert GmbH & Co. Kommanditgesellschaft, Heiligenhaus, Fed. Rep. of Germany

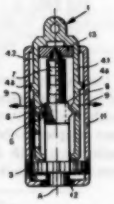
Filed Oct. 3, 1985, Ser. No. 783,486

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1984, 3443288

The portion of the term of this patent subsequent to Jun. 2, 2004, has been disclaimed.

Int. Cl.⁴ E05C *3/26*

U.S. Cl. 292—201 **13 Claims**



1. A device for electrically locking and unlocking vehicle doors and the like and including at least one door having an individual lock, and having electromechanical actuating means for actuating a control rod operatively connected to said individual lock, said device comprising:

a reversible electric motor having an output;

a transmission connected to said output; and

an actuating mechanism for operating said lock, said mechanism comprising:

an actuating member connected to said rod and formed with two spaced-art parallel arms which carry respective inwardly projecting formations;

a spindle received between said arms and driven by said transmission, said spindle being formed with a self blocking screwthread; and

a spindle-nut threadedly mounted on said spindle and having ridges which are dimensioned and positioned to carry along said actuating member during a lock stroke thereof, by engaging said projecting formations of said actuating member, and said arms and the respective projecting formations being formed of sufficiently elastic material to resiliently allow the respective ridges, upon completion of a respective lock stroke and upon completion of a respective unlock stroke, to override said projecting formations of said arms.

4,708,379

ADJUSTABLE LATCH

Hui P. Ching, Mei Foo Sun Cheun, Hong Kong, assignor to Kambo Security Products Ltd., Kowloon, Hong Kong

Filed Aug. 5, 1986, Ser. No. 893,397

Int. Cl.⁴ E05C *1/16*

U.S. Cl. 292—337 **22 Claims**

1. An adjustable latch for a lockset for adjusting to either of two backset positions for the lockset, including

a first cylindrical member having a first particular diameter,

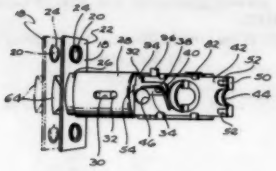
a second cylindrical member having a second diameter larger than the first diameter and with the first and second cylindrical members located in a telescopic arrangement for providing a telescopic adjustment between the cylindrical members,

a first detent means interconnected between the first and second cylindrical members and having two detent positions corresponding to the two backset positions for telescopic positioning of the cylindrical members in the two detent positions,

a latch located within the first cylindrical member,

an actuating member located without the cylindrical members at a position opposite to the latch for actuating the latch between open and closed positions,

a second detent means formed as a sliding member interconnecting the latch and the actuating member and including



two detent positions corresponding to the two backset positions for locking the sliding member to the actuating member in either of the two detent positions, and

unlocking means coupled to both the first and second detent means for unlocking both detent means to allow adjustment between the two backset positions.

4,708,380

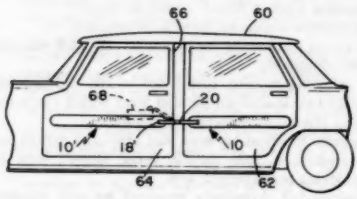
VEHICLE DOOR PROTECTOR

Richard Cruz, 3565 Bayonne Dr., San Diego, Calif. 92109

Filed Nov. 7, 1986, Ser. No. 928,192

Int. Cl.[4] B60R *13/04*

U.S. Cl. 293—128 **17 Claims**



1. A protective device for removable attachment to the side of a vehicle, comprising:

an elongated strip of a resilient semi-rigid material having front and rear surfaces;

attachment means for removably attaching said strip to the side of a vehicle; and

retainer means coupled adjacent one end of said strip for removably securing said strip to a vehicle, said retainer means comprising a flexible strap coupled at one end to said strip one end with a first section of material of at least one of hook-type and loop-type materials mounted upon said strap adjacent the strap other end with a second section of material of the other of a hook-type and loop-type materials mounted upon said strap between said strap one end and said first section of material.

4,708,381

HOLDER FIXED BY VACUUM FOR INDUSTRIAL USE

Stig Lundback, Vaxholm, Sweden, assignor to Astra-Tech Aktiebolag, Sweden

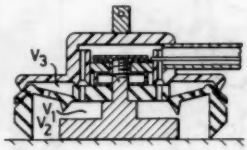
Filed Apr. 4, 1986, Ser. No. 849,481

Claims priority, application Sweden, Apr. 26, 1985, 8502049 3

Int. Cl.[4] B25B *11/00*; **B25J** *15/06*

U.S. Cl. 294—64.1 **4 Claims**

1. A holder for attachment to an object by means of a vacuum from a vacuum source to enable the object to be lifted, transported or held stationary comprising a rigid backpiece, a seal element having a peripheral sealing ring portion terminating in a sealing lip, which lip defines a plane and is adapted to engage a substantially planar surface portion of the object, and having a deformable flange portion joined to the sealing ring portion adjacent its perimeter and to the backpiece at a first sealed juncture therewith inwardly of its perimeter, the flange portion being deformable to enable movement of the sealing ring portion between active and idle positions relative to the backpiece, and a substantially rigid distance-maintaining element affixed to the backpiece within the sealing lip and having a frontal surface spaced-apart toward the backpiece from the plane of the sealing lip when the sealing ring portion is in its idle position and located to engage the object when the sealing ring portion in its active position, valve means coacting between the flange portion of the seal element and the distance-



maintaining element, the valve means being closed when the sealing ring portion is in its idle position and open when the sealing ring is in its active position, means associated with the backpiece for communicating a volume V_1 within the seal element and upstream of the valve means with the vacuum source, and resilient means acting between the backpiece and seal element for urging the sealing ring portion toward its idle position to keep the valve means closed when the object is not engaged and for yielding upon movement of the sealing ring portion toward its active position by engagement with the object surface to enable the valve means to open and communicate the vacuum from the vacuum source to a second volume V_2 defined by the seal element and the object.

4,708,382

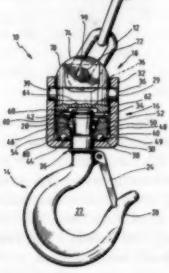
SEPARABLE LIFTING HOOK

Kenneth H. LaCount, Lexington, S.C., assignor to Cooper Industries, Houston, Tex.

Filed Jan. 20, 1987, Ser. No. 4,933

Int. Cl.[4] B66C *1/34*

U.S. Cl. 294—82.1 **9 Claims**



1. A lifting hook assembly comprising:

a hook member having a tapered shank portion disposed above the throat of said hook member;

a plurality of tapered wedge members constructed and ar-

ranged to substantially surround said tapered shank portion of said hook member;

a substantially toroidal member constructed and arranged to surround said tapered wedge members, said substantially toroidal member having a tapered inner surface;

a cap constructed and arranged to fit over said substantially toroidal member for retaining said tapered wedge members axially in position with respect to said tapered shank portion of said hook member;

a housing surrounding said substantially toroidal member, said housing including means for attachment of chain, rope or the like;

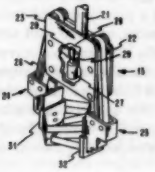
whereby said hook member is supported in said substantially toroidal member by the interfitment of said tapered wedge members between said substantially toroidal member and said tapered portion of said hook member.

4,708,383

MANIPULATOR GRIPPER TOOL

Thomas J. Deringer, Boca Raton, Fla., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 27, 1986, Ser. No. 879,744
Int. Cl.[4] B25J *15/00*
U.S. Cl. 294—86.4 **5 Claims**



1. In a robot having a gripper including a pair of fingers and a drive means for driving the fingers toward and away from one another while said fingers remain parallel to each other;

an end-of-arm tool comprising:

a first clamp for attaching to one finger of said pair of fingers;

a second clamp for attaching to the other finger of said pair of fingers;

a first closed loop holding band attached to said first clamp and extending therefrom at right angles in a predetermined plane;

a pair of closed loop holding bands attached to said second clamp and extending at right angles therefrom parallel to each other and separated by a space greater than the width of said first band;

said first closed loop holding band fitting into the space between said pair of closed loop holding bands;

an inward facing corner located at the outer tip of each closed loop holding band nearest the opposite finger towards which said closed loop holding band extends;

an inward facing V-shaped connector located between the bands of said pair of closed loop holding bands at the outer ends thereof having the same inward facing angle as the inward facing corner located at the outer tip of each of said bands;

a work space formed of the common area within said first and pair of closed loop holding bands, the work space becoming larger as the drive means moves said fingers toward one another and becoming smaller as the drive means moves said fingers away from one another;

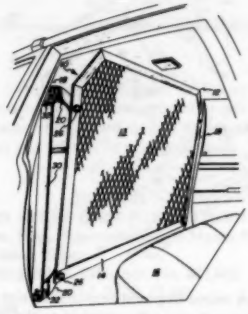
said first closed loop holding band and said pair of closed loop holding bands are so shaped relative to one another to center and grasp in said inward facing corner an object located in said workspace as said fingers are moved away from one another.

4,708,384

PROTECTIVE AUTOMOBILE PARTITION

Thomas LaRosa, 7 Farnam Pl., Albany, N.Y. 12205

Filed Feb. 14, 1985, Ser. No. 701,860
Int. Cl.[4] B60R *27/00*
U.S. Cl. 296—24 R **4 Claims**



1. A protective separator for placement in an automobile comprising:

a divider adapted to be installed between the front and rear seats of the automobile;

at least two "L" shaped brackets to secure each side of the divider to the inner walls of the automobile, brackets on the same side being adapted to secure the top and bottom portions of the divider to the car wall, said brackets having a gradually curved central portion forming the corner of the "L", and substantially centrally located longitudinal slots throughout said curved portion and at least one longitudinal slot located near the end of each bracket, said centrally located slots and said end slots affording secureable adjustibility of said separator without removal of securing bolts normally placed therethrough; and

an adaptor bar secured to the top and bottom bracket on each side of the divider and spanning the space therebetween, each bar possessing at least two vertical slots by which said bars are secured to said brackets at a predetermined position along the substantially centrally located longitudinal slots in the brackets to allow vertical movement of said bars to said predetermined position, said bars secured in a spaced apart relationship from the automobile wall and the divider, the positioning of the bar along said curved portion effecting an articulation of the bar to the most advantageous position for substantially limiting access around the divider.

4,708,385

REAR SEAT APPARATUS OF A TRUNK THROUGH TYPE

Nobuaki Kondo, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

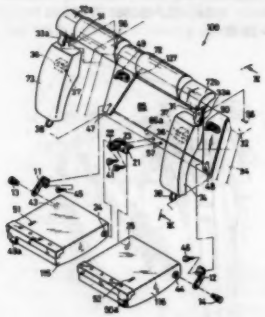
Filed Sep. 17, 1986, Ser. No. 908,206
Claims priority, application Japan, Sep. 27, 1985, 60-213923
Int. Cl.[4] B60N *1/02*
U.S. Cl. 296—65 R **6 Claims**

1. A rear seat apparatus of a trunk through type including a communicating port communicated with a trunk room, said apparatus comprising:

a top seat portion attached to a seat back support member forming said communicating port;

right and left side seat portions disposed below both side ends of the top seat portion and each having a fitting portion for fitting the upper portion of each side seat portion to wheel housing means connected to the seat back support member, the lower portion of each side seat

portion being attached to the lower portion of the wheel housing means; and



main seat back means disposed between the right and left sde seat portions and pivotally attached to the seat back support member and covering the communicating port.

4,708,386

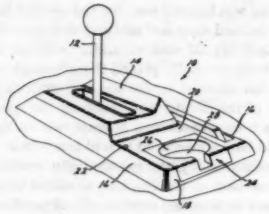
INTEGRATED CONSOLE CUP HOLDER

Michael G. Moore, Rochester, and Ronald E. Mills, Birmingham, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed May 5, 1986, Ser. No. 859,978

Int. Cl.[4] B60R 7/04

U.S. Cl. 296—37.8 **1 Claim**



1. In combination with a motor vehicle of the type including a console housing positioned in the passenger compartment and centrally of the vehicle, an integrated permanently exposed first cup holder formed in said housing and comprising a recess adapted to receive a cup like vessel and be in supporting relationship to the side of the vessel, said console housing including an upstanding end wall and side walls which are interconnected adjacent their upper edge with a generally planar horizontally extending top wall, each of said top wall and end wall having a cutaway section therein, said cutaway sections cooperating to provide an opening capable of receiving a panel member, said panel member being slidably supported on the edge portions of the cutaway section of the horizontally extending top wall whereby the panel is reciprocally slidable with respect to other portions of said console housing, said panel member having a generally flat horizontal surface which is in planar registry with said console top wall and further including an opening defining said first cup holder recess, a second cup holder extending generally parallel with and beneath said horizontally extending console top wall and supported on the edge portions of the cutaway section of the horizontally extending console top wall such that said panel overlies said second cup holder during portions of its reciprocal movement, said second cup holder further including an aperture which defines a cup holder which is accessible during portions of the reciprocal movement of said panel.

4,708,387

TAKE-DOWN SEAT FOR AUTOMOBILE

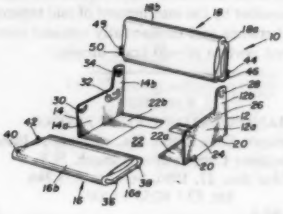
Eiiti Yamano, and Yoshihiko Yamauchi, both of Kanagawa, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan

Filed Dec. 19, 1985, Ser. No. 810,559

Claims priority, application Japan, Jan. 30, 1985, 60-11432[U]

Int. Cl.[4] B60N 1/10

U.S. Cl. 296—63 **9 Claims**



1. An automobile seat assembly comprising:

a floor comprising a pair of spaced recesses;

a pair of side supports, each of said side supports having a shape substantially identical to a corresponding one of said spaced recesses, each of said side supports being pivotally connected to said floor adjacent to one of said corresponding recesses so that each of said side supports is pivotal from a folded position wherein said side support is received in said corresponding recess, to an upright position;

a seat cushion;

a seat back; and

means for detachably mounting said seat cushion and said seat back on said side supports when in said upright position so as to form a seat having a back rest, wherein said seat cushion and said seat back are completely removable from the automobile so as to increase the amount of overall luggage area.

4,708,388

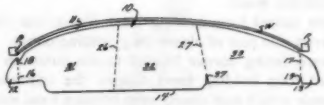
DASHBOARD COVER

Walter Zacharczuk, 6459 Zelzah Ave., Reseda, Calif. 91335

Filed Jan. 16, 1987, Ser. No. 4,037

Int. Cl.[4] B60J 9/00

U.S. Cl. 296—97 B **3 Claims**



1. A sunshield for use in covering the dashboard of a motor vehicle, comprising:

a thin, substantially rigid, membrane of a planform generally like the planform of said dashboard, said membranes being characterized as an elongate sheet having a first and second tapered end at the longitudinal edges thereof, said first and second tapered end at the longitudinal edges thereof, said first and second ends including end fold lines for the folding thereof in a first direction to align adjacent the ends of said dashboard and in a second direction to fold over said sheet, said sheet including further a plurality of intermediate fold lines for convolving segments of said sheet relative each other, said end and intermediate fold lines being aligned to provide a stacked folding of said

segments in one manner of folding and to interlock said first and second ends to each other to form a triangular structure when folded in a second manner of folding.

4,708,389

OPEN TOP TYPE AUTOMOBILE BODY STRUCTURE

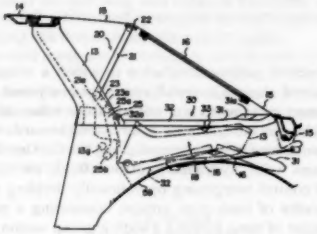
Jiro Maebayashi, and Masaya Hamamoto, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Nov. 26, 1985, Ser. No. 801,837

Claims priority, application Japan, Dec. 3, 1984, 59-255223; Dec. 3, 1984, 59-183460[U]

Int. Cl.⁴ B60J *7/11, 7/12, 7/195*

U.S. Cl. 296—107 **17 Claims**



1. An open top automobile body including a body structure having a front windshield section, a rear body section comprising opposite side panels and a rear section, said rear body section having an upper edge portion defining an open top, a hoop member of a substantially inverted U-shape having a pair of leg portions swingably mounted respectively on the opposite side panels for movement between an erected position wherein the hoop member extends substantially upright and a retracted position wherein the hoop member is retracted in the rear section, a rigid roof panel adapted to be placed between the front windshield section and the hoop member in the erected position, foldable rear hood means having a front edge portion secured to the hoop member and side and rear edge portions secured to said rear body section of the body structure, the improvement resides in that said side and rear edge portions of the rear hood means are secured to the rear body section at portions below the upper edge of the rear body section, substantially U-shaped peripheral hood tensioning link means being provided for movement between an operative position wherein it cooperates with the upper edge of the rear section of the body structure to hold the rear hood means between the link means and the upper edge of the rear body section over substantially an entire outer periphery of the substantial U-shaped peripheral hood tensioning means, and an inoperative position wherein the link means is below the upper edge of the rear body section to release the rear hood means, and moving means beng provided for moving the hood tensioning link means to the operative position when the hoop member is moved to the erected position and to the inoperative position when the loop member is moved to the retracted position.

4,708,390

LASER CONTOUR CUT DOOR BEAMS

Gunther H. Palentyn, Grand Blanc; James R. Dehlinger, Ada, and Donald R. Rigsby, Jenison, all of Mich., assignors to Benteler Corporation, Grand Rapids, Mich.

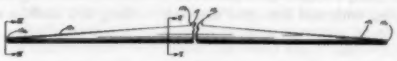
Division of Ser. No. 798,299, Nov. 15, 1985, Pat. No. 4,636,608. This application Jul. 29, 1986, Ser. No. 890,338

Int. Cl.⁴ B60J *5/04*

U.S. Cl. 276—188 **2 Claims**

1. An automobile impact door beam comprising:

an elongated structural tube having a peripheral wall around a central axis along its length, and contoured end portions of said tube, each end portion having an outer terminus comprising an arcuate edge surface of said tube wall in a plane transverse to said axis, an inner terminus comprising an arcuate edge surface of said tube wall in a second plane



transverse to said axis, and a pair of mirror image wall edge surfaces tapering from said inner to said outer terminus and joining ends of said arcuate edge surfaces to form a contoured end portion of said door beam.

4,708,391

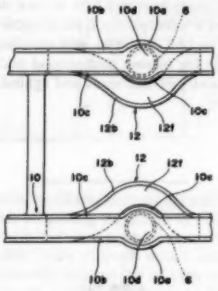
REAR BODY STRUCTURE FOR MOTOR VEHICLE

Mitusou Nakano, Kure, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 3, 1986, Ser. No. 881,653

Int. Cl.⁴ B62D *23/00*

U.S. Cl. 296—204 **10 Claims**



1. A rear body structure for a motor vehicle, which comprises:

a floor panel;

a rear side frame mounted to said floor panel and extending in a longitudinal direction of a vehicle body on each side at the rear portion thereof;

said rear side frame including a raised portion;

said raised portion including a thin portion which is thinner in thickness in a vertical direction that other portions of the rear side frame that are in front of and at the back of the thin portion;

a protruding portion arranged on said rear side frame which protrudes sideways around said thin portion, said thin portion disposed directly between and in contact with said floor panel and said protruding portion; and

a spring for rear suspension disposed under said thin portion of said rear side frame.

4,708,392

HINGE JOINT FOR THE SEATS OF AUTOMOTIVE VEHICLES AND THE LIKE

Heinz Werner, Remscheid, and Hansjörg Walk, Reutlingen, both of Fed. Rep. of Germany, assignors to Keiper Recaro GmbH & Co., Remscheid, Fed. Rep. of Germany

Filed Jul. 2, 1986, Ser. No. 881,225

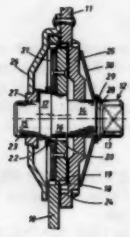
Claims priority, application European Pat. Off., Jul. 2, 1985, 85108180.2

Int. Cl.⁴ B60N *1/02*

U.S. Cl. 297—362 **22 Claims**

1. A hinge joint, particularly for use between a stationary

and a pivotable part of a seat in a motor vehicle, comprising a first component; a second component; and means for pivotally coupling said second component to said first component, including a shaft rotatably journalled in one of said components, a first gear provided on said first component and surrounding said shaft, a second gear provided on said second component, mating with said first gear and surrounding said shaft, a substantially cylindrical first eccentric provided on said shaft, and a substantially frustoconical second eccentric provided on said shaft, one of said gears having a first surface surrounding said first eccentric and a substantially frustoconical second surface surrounding said second eccentric, said coupling means further comprising means for biasing said second eccentric and said second surface axially of said shaft and against each other.



4,708,393

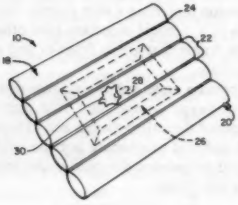
POCKET SEAT CUSHION

Mary A. Fallis, 327 Torner Rd., Baltimore, Md. 21221; Joseph F. Urso, 47 Chandelle Rd., and Samuel J. Urso, 502 Middle River Rd., both of Baltimore, Md. 21220

Filed Dec. 23, 1986, Ser. No. 936,769

Int. Cl.[4] A47C 7/02

U.S. Cl. 297—452 **2 Claims**



1. A system of inflatable seat cushion and storage for same, characterized by the inflatable seat cushion having a front and a back and being foldable upon itself deflated, said storage comprising: a rectangular envelope with an open face and a plurality of margins therearound foldable over the open face, means for fastening said open face centrally to the back of the inflatable seat cushion and permitting receiving said inflatable seat cushion folded upon itself, centrally within said envelope, and means for detachably securing each of said plurality of margins of said envelope folded over the folded inflatable seat cushion.

4,708,394

METHODS OF CONTROLLING THE OPERATION OF MINERAL MINING INSTALLATIONS

Uwe Trox, Ottmarsbocholt, and Willy Kussel, Werne, both of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia GmbH, Lunen, Fed. Rep. of Germany

Filed May 29, 1986, Ser. No. 868,017

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1985, 3520617

Int. Cl.[4] E21D 23/12

U.S. Cl. 299—1 **6 Claims**

1. In a mineral mining installation in which a winning machine is moved along a longwall conveyor composed of individual channel sections to win mineral from a face alongside the conveyor and the conveyor is advanced towards the face behind the machine as it progresses along the face by charging shifting rams with hydraulic pressure fluid; an improved method of control comprising operationally dividing the ram into a plurality of bank-push groups, connecting a predetermined number of rams forming a sliding group within a bank-push group with a pressure fluid supply simultaneously for a preselected time, disconnecting one of the rams remote from the winning machine from the supply and connecting a ram which is the next following within the bank-push group and nearest the machine to the supply to replace said one remote ram and maintain the predetermined number of rams and repeating this cycle to cause the sliding group to progress within the bank-push group and follow the progress of the machine.

4,708,395

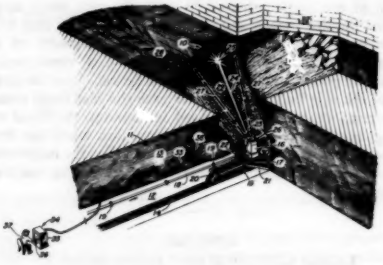
REMOTELY SENSING OF EXCAVATION CAVITY DURING MINING

Eston F. Petry, Barrackville, and John B. Riester, Morgantown, both of W. Va., assignors to Conoco Inc., Wilmington, Del.

Continuation of Ser. No. 668,543, Nov. 5, 1984, abandoned. This application Aug. 8, 1986, Ser. No. 882,574

Int. Cl.[4] E21C 35/24, 37/12

U.S. Cl. 299—17 **14 Claims**



9. Method of hydraulically mining a surface of a mining location comprising:

a. determining the dimensions of said surface of said mining location from a fixed point at said location;

b. constructing at a second location remote from said mining location a visual representation of said surface from the determined dimensions of said mining location with respect to said fixed point;

c. jetting water under high pressure against a selected area on said surface of said mining location;
d. determining changes in said dimensions of said selected area of said surface of said mining location;
e. reconstructing at said second location a new visual representation of said surface from the determined changes of said location during the jetting of said water; and
f. redirecting said jetted water under high pressure utilizing data from said reconstruced visual representation.

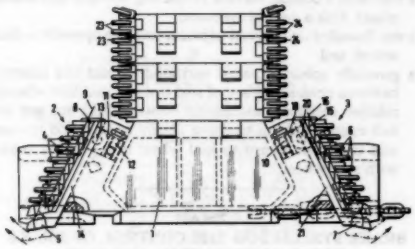
14. An apparatus for hydraulic mining of materials, said apparatus including a frame having a nozzle means having vertical and horizontal positioning means mounted on said frame, and a first input means coupled to said nozzle means, an improvement comprising:
a. distance measuring means mounted on said frame and oriented to measure in the direction of said nozzle;
b. means for operating said distance measuring means;
c. diverter nozzle means mounted on said frame and oriented along the direction of said nozzle means;
d. second input means coupled to said diverter nozzle means; and
e. means for coupling said first input means to a source of high pressure fluid while said distance measuring means is not in operation and for coupling said second input means to said source of high pressure fluid when said distance measuring means is in operation.

4,708,396

COAL SHAVER

Dieter Nowak, Herne, Fed. Rep. of Germany, assignor to Klöckner-Becorit GmbH, Castrop-Rauxel, Fed. Rep. of Germany

Filed May 9, 1986, Ser. No. 861,298
Claims priority, application Fed. Rep. of Germany, May 11, 1985, 3517064
Int. Cl.[4] F21C *27/44*
U.S. Cl. 299—34 **5 Claims**



1. A coal shaver apparatus for shaving pieces of coal from a side wall of a coal deposit, said coal shaver apparatus comprising

an elongated carriage body which is adapted for back and forth movement parallel to the side wall of a coal deposit, said elongated carriage body having a front side facing the side wall of the coal deposit, a bottom side, a top side and opposite ends, said elongated carriage body also including straight guide channels which respectively extend from the top side to the bottom side near the opposite ends thereof,

a mounting means attached to said elongated carriage body near the upper end of each said guide channel so as to be movable along the associated guide channel,

a pair of elongated cutter elements respectively attached to the front side of said elongated carriage body near the opposite ends thereof, each of said pair of cutter elements being mounted to said elongated carriage so as to be pivotable about an axis line which extends upwardly, each of said pair of cutter elements including vertically spaced apart shearing blades for contacting the side wall of the coal deposit, and

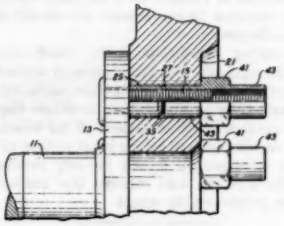
a pair of bottom blade elements which are attached to said elongated carriage body and are associated with a respectively guide channel, each bottom blade element including a straight shank which extends within a guide channel and has an upper end and a lower end, the upper end of each shank being attached to a respective mounting means, and a bottom blade attached to the lower end of each shank so as to contact the coal deposit below the shearing blades of an associated cutter element.

4,708,397

MOTOR VEHICLE WHEEL MOUNTING MEANS AND METHOD

Paul R. Weinmann, 57 Murray St., Rochester, N.Y. 14606

Filed Aug. 12, 1986, Ser. No. 895,693
Int. Cl.[4] B60B *3/16*
U.S. Cl. 301—9 DN **7 Claims**



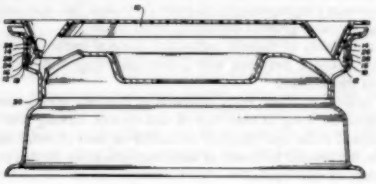
1. The combination of a vehicle wheel hub having a plurality of threaded studs projecting therefrom in a direction parallel to a rotary axis of said hub, and a wheel mounted on said hub and having cylindrical holes through which said studs pass, said wheel being relatively thick in the vicinity of said holes, and a lug nut screwed on each of said studs to hold said wheel in place, each of said lug nuts having a cylindrical shank portion fitting snugly in one of said cylindrical holes through only a part of the length of such hole, there being a substantial space between said hub and the inner end of said shank portion, and an internally threaded and externally smooth cylindrical sleeve mounted on each stud with its inner end tight against said hub, said sleeve fitting snugly within a hole in said wheel to support said wheel in the region of the thickness of the wheel close to said hub, in said space between said hub and the inner end of said shank portion of said nut.

4,708,398

WHEEL COVER RETENTION SYSTEM WITH PILOT RIBS

Norman S. Loren, Warren, Mich., assignor to Michael Ladney, Jr., Sterling Heights

Filed Sep. 24, 1985, Ser. No. 779,631
Int. Cl.[4] B60B *7/00*
U.S. Cl. 301—37 PB **9 Claims**



1. A wheel cover for a wheel having a generally annular

wheel portion including a circumferential retention groove, the wheel cover including:

a plurality of rigid pilot ribs located at a first set of preselected points about the circumference of the inner face of the wheel cover and extending axially inward from the inner face of the wheel cover, the pilot ribs defining a circumference slightly smaller than the smallest circumference on the inner face of the wheel;

a plurality of resilient retention fingers located at a second set of preselected points at spaced apart locations from said first set of points about the circumference of the inner face of the wheel cover, the first end of each of the fingers being secured to the inner face of the wheel cover, the second end of each of the fingers extending axially inward at a distance less than that of the rigid pilot ribs, the second end of each of the fingers also extending radially outward from the first end, defining a circumference slightly larger than the circumference on the retention groove; and

a generally circular wire spring member secured about its circumference in contact with the inner surfaces of the resilient retention fingers nearest the second ends of the retention fingers,

whereby, during installation of the wheel cover on the wheel, the rigid pilot ribs simultaneously contact the inner surface of the wheel, thereby limiting radial movement of the wheel cover as the resilient retention fingers subsequently contact the inner surface of the wheel, are compressed radially inward by the inner surface of the wheel and are subsequently forced radially outward by the spring force of the wire member into contact with the retention groove on the wheel.

4,708,399

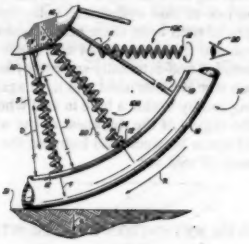
FLOATING RESILIENT SKELETAL CHAMELEON-LIKE AUDIBLE HELIX FOR BICYCLE

Donald N. Mendres, P.O. Box 6321, Scottsdale, Ariz. 85261

Filed Mar. 9, 1987, Ser. No. 23,256

Int. Cl.[4] B60B *7/00*

U.S. Cl. 301—37 SA **16 Claims**



1. A cycle including

(a) a frame; and

(b) at least one ground engaging wheel rotatably mounted on said frame and including

(i) a hub,

(ii) annular rim means spaced apart from said hub and including circular ground engaging tread means,

(iii) a plurality of radially extending skeletal spokes spanning the distance between and interconnecting said hub and rim means, and

(iv) helical resilient light diffracting floating spring means circumscribing at least one of said spokes, having first and second ends, and slidably mounted on said skeletal spoke for movement between at least two positions during operation of said cycle,

a first operative position with said first end contacting said rim means and said spring means compressed against said rim means by at least one of

the force of gravity, and

centrifugal force generated during rotation of said wheel, and

a second operative position with said second end of said spring means forced against said hub by the force of gravity,

the unstressed length of said spring means being less than the length of said spoke.

4,708,400

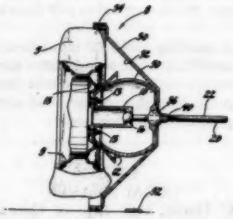
SPARE TIRE INSTALLATION WITHOUT CONVENTIONAL JACK

Edward D. Klomp, Mt. Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 28, 1986, Ser. No. 935,980

Int. Cl.[4] B60B *11/00*

U.S. Cl. 301—38 S **8 Claims**



1. A vehicle wheel tire jacking system, said system in combination comprising:

a hub for attachment to said vehicle wheel with a conical surface projecting away from said vehicle wheel;

a threaded rod pivotally and nonrotatively connected with said hub;

a tire with a conical surface projecting toward said vehicle wheel with a central aperture;

a nut threaded on said rod adjacent said tire opposite vehicle wheel; and

a generally spherical insert surrounding said rod captured between conical surface of said tire and said hub whereby relative rotational movement between said nut and said hub causes said nut to move axially on said rod to cause said tire to be joined to said wheel in a position coaxial with said wheel.

4,708,401

BRAKE SYSTEM FOR THE CONTROL OF BRAKE FORCE DISTRIBUTION AND SLIP

Hans-Christof Klein, Hattersheim, Fed. Rep. of Germany, assignor to Alfred Teves GmbH, Frankfurt, Fed. Rep. of Germany

Filed Jul. 11, 1985, Ser. No. 754,071

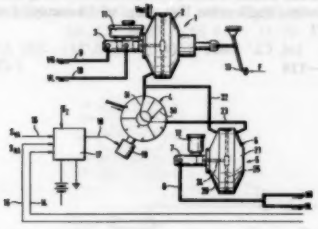
Claims priority, application Fed. Rep. of Germany, Jul. 12, 1984, 3425672

Int. Cl.[4] B60T *8/02, 8/26*

U.S. Cl. 303—6 R **7 Claims**

1. A brake system for automotive vehicles having front and rear wheels and front and rear wheel brakes, comprising: a pedal-actuated braking pressure generator unit for generating braking pressure in the wheel brakes of the front wheels; an electrically-controlled braking pressure generator unit for varying the braking pressure in the wheel brakes of the rear wheels, said unit having a vacuum chamber and a working chamber with a closeable outside-air inlet; a vacuum source attached to said vacuum chamber; sensors associated with said wheels to determine the vehicle speed and the wheel rotational behavior and to generate signals indicating this information; electronic circuits for receiving and logically processing said signals, and for generating control signals; and a three-way/-

three-position rotary spool valve for receiving said control signals, said valve having a stationary control disc and a movable control disc with an opening therein permitting communication between either of said vacuum source or outside air through said inlet and the working chamber of said electrically-controlled braking pressure generator unit, whereby said



valve varies the pressure difference between said vacuum and working chambers depending upon the angular position of said two discs relative to each other and to the opening cross-section and whereby the braking pressure on the wheels can be adjusted in response to said control signals from any of the three valve positions directly to any other valve position.

4,708,402

BRAKE SIGNAL CONVERSION DEVICE FOR RAILWAY CARS

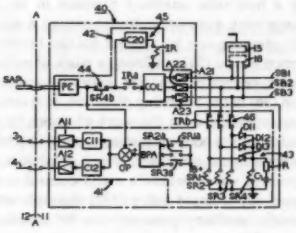
Osamu Kanda, Kobe, Japan, assignor to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed May 28, 1986, Ser. No. 868,235

Claims priority, application Japan, May 31, 1985, 60-83182[U]

Int. Cl.⁴ B60T *17/00*

U.S. Cl. 303—20 **18 Claims**



1. A brake signal conversion device for a railway train having a first railway car with a brake system operative in response to a brake control signal in a first signal mode and having a second railway car coupled to said first car with a brake system operative in response to a brake control signal in a second signal mode comprising:

(a) first signal conversion means operative for receiving said first mode brake control signal and converting said first mode brake control signal to said second mode brake control signal;

(b) second signal conversion means operative for receiving said second mode brake control signal and converting said second mode brake control signal to said first mode brake control signal;

(c) first detector means operative in response to said first mode brake control signal for rendering said second signal conversion means inoperative to effect said conversion of said second mode brake control signal to said first mode brake control signal;

(d) second detector means operative in response to said second mode brake control signal for rendering said first signal conversion means inoperative to effect said conversion of said first mode brake control signal to said second mode brake control signal.

4,708,403

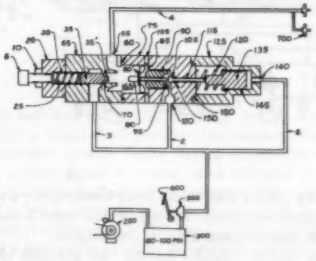
INTERMITTENT VEHICULAR BRAKING APPARATUS AND METHOD

Carl D. Russell, Box 334, Sallisaw, Okla. 74955

Filed Aug. 6, 1986, Ser. No. 893,666

Int. Cl.⁴ B60T *15/58, 15/02;* **G05D** *7/01;* **F17D** *3/01*

U.S. Cl. 303—61 **9 Claims**



6. A vehicular intermittent braking apparatus for location in the main pneumatic line extending from the brake pedal actuated pressure regulator valve to the brake shoe actuators and operable in accordance with the amount of force applied to the vehicular brake pedal, comprising in combination:

a vehicular carried housing connected in said line;

a main line high pressure valve in the housing to interrupt air flow from the pressure regulator valve to the actuators when closed, said high pressure valve being normally biased closed;

said housing including a large cylinder and a small cylinder adjacent to one end of the large cylinder and a compartment adjacent to the other end of the large cylinder;

a shuttle piston having a large diameter portion slidable in the large cylinder and a small diameter portion slidable in the small cylinder;

an air connection from the regulator valve side of the main line to the small cylinder for high pressure air effective against the small end of the shuttle piston portion remote from the large end thereof to apply high presure air whenever the brake pedal is depressed and moves the shuttle piston toward the high pressure valve when it is closed;

a shuttle exhaust valve carried by and movable relative to the shuttle piston for exhausting said compartment, large cylinder and main line from the housing to the actuators when the high pressure valve is closed;

the direction of travel of said shuttle piston and shuttle valve being reversed when said shuttle valve strikes the high pressure valve to crack it permitting high pressure air to apply force to the large end of the shuttle piston which overcomes the high pressure air applied against the smaller end of the shuttle piston; and,

means responsive to the amount of force applied to said pedal to control the frequency of reciprocating movement of the shuttle valve and shuttle piston.

4,708,404

HYDRAULIC BRAKE SYSTEM WITH HYDRAULIC BRAKE FORCE BOOSTING

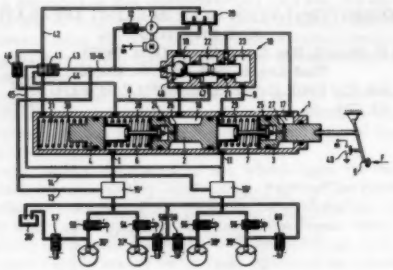
Wolfram Seibert, Darmstadt; Norbert Ocvirk, Offenbach, and Juergen Schonlau, Niedernhausen, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 23, 1986, Ser. No. 821,619

Claims priority, application Fed. Rep. of Germany, Jan. 23, 1985, 3502018

Int. Cl.[4] B60T *8/44, 11/02, 13/12*

U.S. Cl. 303—114 4 Claims



1. A brake system with brake force boosting for a slip-controlled automotive vehicle having vehicle wheels and wheel brakes, said system comprising, in combination:

a tandem master cylinder having two pressure chambers therein;

an auxiliary-pressure control valve having first and second chambers therein respectively connected to said two pressure chambers of said master cylinder by way of pressure fluid lines and said control valve having a compensating chamber therein;

first and second multidirectional valves respectively connected by way of pressure fluid lines between said two chambers of said master cylinder and a selected pair of said wheel brakes, each multidirectional valve including a first pressure-controlled multidirectional valve respectively connected in the pressure line between one of said two pressure chambers of said master cylinder and one of said pair of wheel brakes, and a second pressure-controlled multidirectional valve respectively connected in the pressure line between said compensating chamber and one of said pair of wheel brakes;

an auxiliary-pressure supply including a hydraulic pump having an input, said hydraulic pump being connected to said compensating chamber and said multidirectional valves by way of pressure fluid lines;

a first pressure-compensating and supply reservoir connected to said input of said hydraulic pump and to said compensating chamber by way of pressure fluid lines;

a plurality of electromagnetically actuated normally open inlet valves respectively connected in one of said pressure fluid lines between each wheel brake and one of said first and second multidirectional valves, wherein each inlet valve is switched to its closed position in response to a slip-control signal;

a second plurality of electromagnetically actuated normally closed outlet valves respectively connected between each wheel brake and one of said first reservoir and a second compensating reservoir, wherein each outlet valve is switched to its open position in response to a slip-control signal.

4,708,405

BRAKE PRESSURE GENERATOR FOR A HYDRAULIC BRAKE SYSTEM FOR USE WITH MOTOR VEHICLES

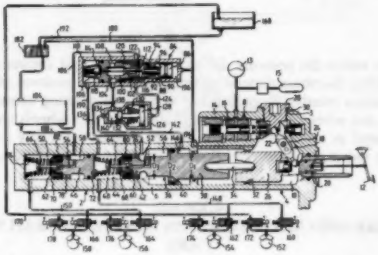
Juan Belart, Walldorf; Wolfram Seibert, Darmstadt, and Norbert Ocvirk, Offenbach, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 24, 1986, Ser. No. 822,024

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1985, 3502281

Int. Cl.[4] B60T *8/44, 13/00, 8/36*

U.S. Cl. 303—114 5 Claims



1. A brake pressure generator for a hydraulic brake system for use with motor vehicles comprising a booster piston displaceable by a hydraulic auxiliary pressure in an actuating direction, comprising a master cylinder having a stepped piston to which pressure can be applied by the booster piston, with the stepped piston (**36**) confining a work chamber and an intake chamber decreasing in size upon movement of the stepped piston (**36**) in the actuating direction, said intake chamber is in communication with the work chamber by way of a non-return valve with a conduit leading from said intake chamber to a non-pressurized container, which conduit is provided with a slip control valve, wherein a slip control is provided comprising said slip control valve (**182**) through which controlled hydraulic auxiliary pressure can be supplied to the intake chamber (**56**) decreasing in size upon movement of the stepped piston (**36**) in the actuating direction during slip control, wherein a second chamber enlarging upon movement of the stepped piston (**36**) in the actuating direction is confined by the stepped piston (**36**), which second chamber is in communication with said intake chamber (**56**) decreasing in size upon movement of the stepped piston (**36**) by way of a connecting line (**142, 136**) and wherein a shut-off valve is provided in the connecting line to shut off the enlarging second chamber during slip control; wherein the slip control valve (**182**), by way of which hydraulic auxiliary pressure can be fed to the intake chamber (**56**) decreasing in size upon movement of the stepped piston (**36**) in the actuating direction during slip control, is assembled so as to communicate with the said intake chamber by way of a control valve (**84**); wherein the shut-off valve (**126**) can be blocked in response to the controlled hydraulic auxiliary pressure; and, wherein the shut-off valve (**126**) comprises a shut-off piston (**128**) displaceable against the force of a spring, with the controlled hydraulic auxiliary pressure being applicable to one side of said shut-off piston.

4,708,406

HYDRAULIC BRAKING SYSTEM WITH MALFUNCTION ALARM JUNCTION

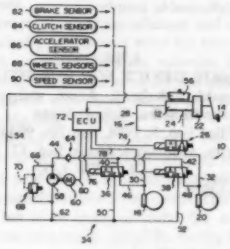
Kozi Takagi, Takahama; Ken Nomura, Okazaki; Yoshiyuki Hattori, Toyoake, and Masahiko Kamiya, Anjo, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Oct. 3, 1986, Ser. No. 915,099

Claims priority, application Japan, Oct. 4, 1985, 60-222446; Oct. 4, 1985, 60-222447; Jul. 30, 1986, 61-179409

Int. Cl.[4] B60T *8/58, 8/46, 11/10*

U.S. Cl. 303—115 7 Claims



4. A hydraulic braking system for a vehicle having at least one wheel with a brake, which comprises:

(a) a master cylinder actuated by a vehicle operator for generating a hydraulic pressure;

(b) a wheel cylinder operatively associated with said brake;

(c) a hydraulic conduit connecting said master cylinder with said wheel cylinder to transmit the hydraulic pressure generated at said master cylinder to said wheel cylinder to apply the brake;

(d) a normally-open electromagnetic shutoff valve disposed in said hydraulic conduit for controlling the fluid communication therethrough, said shutoff valve being responsive to a first control electronic signal to shut off said hydraulic conduit;

(e) pressure modulating means, including a control valve, for modulating the hydraulic pressure at said wheel cylinder, said control valve being operable to relieve the hydraulic pressure at said wheel cylinder in response to a second control signal;

(f) detecting means for sensing the hydraulic pressure at said wheel cylinder and delivering a third signal in response to the hydraulic pressure at said wheel cylinder exceeding a predetermined level;

(g) alarm indicator means for warning the operator of a failure or malfunction of one or more components of said braking system; and

(h) electronic control means responsive to said third signal and to vehicle conditions for controlling said shutoff valve, control valve, and indicator means, said control means being operable to deliver said first control signal to said shutoff valve to close the shutoff valve and maintain hydraulic pressure at said wheel cylinder in response to a condition in which the vehicle is to be maintained immobile, said control means operating to thereafter deliver said second control signal to said control valve for a predetermined time period in an attempt to release the hydraulic pressure at the wheel cylinder in response to an operation by the operator to move the vehicle during the immobilized condition thereof, said control means operating to thereafter determine the presence or absence of said third signal and operating to actuate said alarm indicator means and to terminate delivery of said first signal in response to the presence of said third signal, said control means operating in the absence of said third signal to terminate delivery of said first signal without actuating the alarm indicator means.

4,708,407

ANTI-LOCK BRAKE SYSTEM FOR VEHICLE

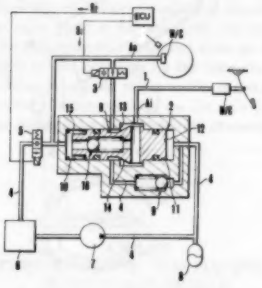
Toshifumi Maehara, Saitama, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 825,042, Jan. 31, 1986, abandoned. This application Dec. 31, 1986, Ser. No. 948,400

Claims priority, application Japan, Feb. 6, 1985, 60-21323

Int. Cl.[4] B60T *8/40, 13/70*

U.S. Cl. 303—116 3 Claims



1. In an anti-lock system for a vehicle having a first valve arranged in a brake fluid pressure transmission line from a master cylinder to each brake device to operate under an anti-lock control signal, a second valve arranged to open for reducing the brake fluid pressure, a pressure fluid return device arranged to bring the brake pressure fluid into an accumulator for returning the pressure fluid to the upstream side of said first valve and a gate valve arranged in between said first valve and said master cylinder, an improvement characterized in that:

said gate valve (2) is provided with an axial extending balance piston (12) which is arranged to receive at one end in the axial direction thereof said pressure fluid brought into said accumulator (8) and to receive said pressure fluid of said brake device (W/C) at the other end; said gate valve including a shut-off valve device (13, 14) arranged at an axially intermediate portion of said balance piston between the ends thereof to close a passage between said master cylinder (M/C) and said first valve (3) according to the movement of said balance piston, the balance piston including therein a one-way valve communicating with the other end thereof which permits the flow of the pressure oil from the brake device to the master cylinder but blocks the flow of the pressure oil from the master cylinder to the brake device.

4,708,408

HOME ENTERTAINMENT ACCESSORY ORGANIZER

Ronnie Kennon, 833 University Blvd., Mobile, Ala. 36609

Filed Sep. 12, 1986, Ser. No. 906,409

Int. Cl.[4] A47B *81/06, 49/00*

U.S. Cl. 312—9 1 Claim

1. A video and audio accessory storage device comprised of; a rectangular shape, a bottom wall, two side walls, two end walls, means at either end to house several circular holes for holding pencils, means on either side wall for housing compartment that holds T. V. Guide, a plurality of spaced, parallel, divider panels disposed between, and spaced from, said end walls and extending parallel thereto, said divider panels each being substantially identical in shape to said end walls, and secured and extending perpendicularly to, said front, back and bottom walls, a rotating base comprising a lower circular plate having a downwardly directed circular groove, forming a race for spherical ball bearings, said ball bearings being housed in a ring, of slightly less radius than that of said racing groove, said ring being comprised of tubular openings of slightly larger

radius than that of said ball bearings and spaced apart in a manner which allows use of less ball bearing to achieve the same desired result, a circular cover plate on which upper section of said bearings race along, the periphery of said upper

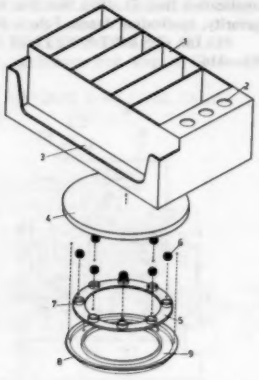


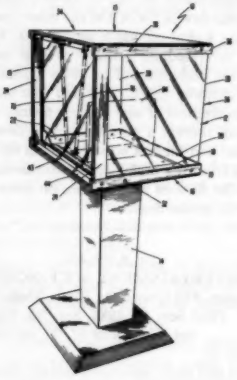
plate extending downward to cover outer peripheral edge of said lower circular plate, so as to hold said bearing in said race without impeding the rotation of said base, fixing means to attach said top plate to said lower plate in such a fashion as to hold said lower plate in place but not impede rotation.

4,708,409

DISPLAY CONTAINER FOR PUBLICATIONS

Ronald C. Voegeli, 918 Gibbs Rd., Venice, Fla. 33595

Filed Jan. 8, 1986, Ser. No. 817,088
Int. Cl.[4] A49F *3/00*
U.S. Cl. 312—138 A **13 Claims**



1. In a display container for publications of the type comprising a rigid stationary housing, a door swingably mount to said housing, and spring means for biasing said door closed, the improvement wherein:

said door is transparent to enable an interior of said container to be viewed through said door when said door is in a closed position, said door comprising a sheet of transparent flexible material achored along an inner edge thereof to said housing so as to be flexibly swingable in cantilever fashion to an open condition wherein said door forms a curvalinear flexure region interconnecting said anchored inner edge and an outer portion of said door when said door is in said open condition, said sheet including an inwardly facing rear surface and an exteriorly facing front surface,

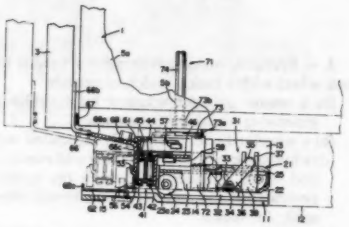
said spring means disposed behind said door and comprising an elastically deformable member having an outer end connected to said interiorly facing rear surface of said sheet outwardly of said flexure region and an inner end anchored inwardly of said flexure region so that movement of said sheet from a closed condition to an open condition elastically deforms said expandable member to bias said sheet closed, said deformable member biased toward said rear surface to retain a viewable copy of a publication slid into a position between said rear surface and said deformable member.

4,708,410

DOOR DEVICE FOR FURNITURE

Yoshiyuki Mazaki, Kokubunji, Japan, assignor to Kabushiki Kaisha Murakoshi Seiko, Tokyo, Japan

Filed Sep. 8, 1986, Ser. No. 904,662
Claims priority, application Japan, Sep. 12, 1985, 60-202446
Int. Cl.[4] A47F *3/00*
U.S. Cl. 312—138 R **5 Claims**



1. In a furniture body that has a pair of opposite sides which are spaced apart laterally, a rear, and an open front at which there are a pair of laterally extending zones, each of which has one end adjacent to the other zone and an opposite end spaced laterally from said other zone, said furniture body having a pair of doors, one for each of said zones, which cooperate to close said front when each is in a closed position wherein it extends edgewise laterally across its zone and has a front surface substantially coplanar with a front surface of the other door, a device for guidingly controlling movement of each said door between its closed position and an open position wherein the door is superposed in front of the other door, said device comprising, for each door:

A. stationary structure fixed on said furniture body near the front thereof and in said zone for the door, said stationary structure comprising

(1) a pair of elongated fore-and-aft extending rail members, each having a front end and a rear end, one of said rail members being near said one end of said zone and the other being near said opposite end thereof,

(2) a supporting rail having an upwardly facing elongated surface that extends laterally substantially the entire distance between said ends of said zone, and

(3) a guide rail having a forwardly facing elongated surface which extends laterally substantially from said one end of said zone to a point which is spaced from said opposite end thereof and is adjacent to the front end of said other rail member;

B. carrier structure movable for translating the door flatwise forward to a defined laterally extending door shifting path and rearward to its closed position, comprising

(1) a pair of elongated carrier elements, one for each of said rail members, each substantially confined by its rail member to forward and rearward motion, and

(2) a laterally elongated slider guide member having oppo-

site end portions which are fixed to said carrier elements;

C. means for guiding the door for motion edgewise along said door-shifting path between the zone for the door and its open position, said means comprising

(1) a plurality of elongated laterally extending slider elements, each having a leading end adjacent to the zone for the other door and an opposite trailing end, said slider elements being confined by cooperation with one another and with said slider guide member to lengthwise sliding motion relative to the slider guide member whereby an outer one of said slider elements is carried between

(a) a retracted position wherein said one slider element is wholly within said zone for the door and

(b) an extended position wherein it is substantially wholly within the zone for the other door, and

(2) means on said outer one of the slider elements for fixing the door thereto;

D. a supporting roller on said outer one of the slider elements, near said leading end thereof, rotatable on a substantially fore-and-aft extending axis and positioned to be spaced a small distance above said surface on said supporting rail but to be engaged under the weight of the door against the supporting rail of the device for the other door when said outer one of the slider elements is in its extended position;

E. an arm fixed to and projecting rearward from the trailing end portion of said outer one of the slider elements; and

F. a guide roller on said arm, rotatable on a substantially vertical axis and arranged

(1) to guidingly engage said other rail member during movement of the carrier structure and

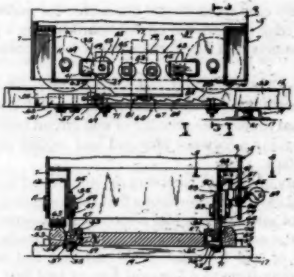
(2) to guidingly engage said forwardly facing surface on the guide rail during motion of said outer one of the slider elements between its retracted and extended positions, to confine the door to edgewise motion along said path.

4,708,411

ANTI TIP SYSTEM

Robert J. Peterman, Hartland, Wis., assignor to Spacesaver Corporation, Fort Atkinson, Wis.

Filed Oct. 27, 1986, Ser. No. 923,275
Int. Cl.[4] A47B *53/00*
U.S. Cl. 312—201 **5 Claims**



1. In a mobile storage system having frame means for supporting at least two parallel rails on a building floor, and at least one movable carriage having a pair of wheels adapted to engage and move along each of the rails,

an improved safety anti tip mechanism comprising:

a. a pair of channels, each channel having a pair of vertically spaced legs and being attached to the frame means adjacent a respective rail, each channel being positioned with the respective legs thereof in horizontal attitudes and extending oppositely from the legs of the other channel;

b. a pair of spaced tabs secured to the carriage between the wheels associated with each rail, wherein:

i. the tabs are formed with generally rectangular shapes having inner and outer ends; and

ii. the tabs are secured to the carriage by welding the respective tab outer ends to the carriage;

c. a pair of allochiral plates, each plate interfitting with a pair of tabs, the plates having generally horizontal lower legs that ride within the channels adjacent the respective rails, wherein each plate is formed with notches that are received by the respective tab inner ends, so that the plates are guided on the carriages by the tabs; and

d. means for securing the plates to the respective tabs,

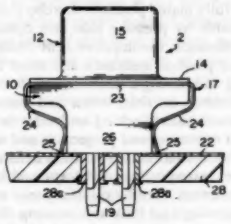
so that lurching of the carriage on the rails does not disengage the plates from the respective channels.

4,708,412

ELECTRICAL CONNECTOR HAVING LOW INDUCTANCE SHIELD

John L. Himes, Jr., Hummelstown; Earl W. McCleerey, and Charles E. Reynolds, both of Mechanicsburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed May 20, 1986, Ser. No. 865,221
Int. Cl.[4] H01R *13/658*
U.S. Cl. 439—95 **11 Claims**



1. An electrical connector, comprising:

dielectric housing means having a mating section and a mounting section, said mating section having a mating face, said mounting section having a mounting face, said housing means having opposed major sides and opposed minor sides extending between the mating face and mounting face, said housing means having terminal passages extending through said mating and mounting sections;

electrical terminal means secured in said terminal passages and having terminating sections extending outwardly from said mounting section for electrical engagement with conductive means on circuit board means when said mounting section engages the circuit board means;

metal shell means disposed on said mating section for matable engagement with a complementary electrical connector; and

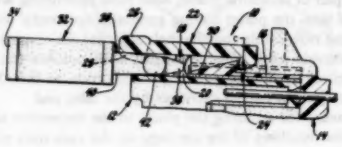
ground contact means for achieving electrical contact with said metal shell means and a ground plate on the circuit board means and for shielding the terminal means through the mounting section, and ground contact means extending substantially the length of said major sides of said housing means, said ground contact means including spring means for urging contact member means of said ground contact means into electrical engagement with the ground plate.

4,708,413

ELECTRICAL CONNECTOR WITH POSITION ASSURANCE AND ASSIST

Diane M. Schroeder, Ravenna, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 21, 1986, Ser. No. 842,196
Int. Cl.[4] H01R *13/631*
U.S. Cl. 439—358 **1 Claim**



1. In an electrical connector that includes,

a first connector body having a surface and an arm, said arm having a latching end and an operating end having a projection, said arm being rockably pivoted to said first connector body intermediate its two ends for movement between a free state position where said operating end projection is spaced a first distance from said surface, a release position where said operating end projection is spaced a lesser, second distance from said surface, and a biased position where said operating end projection is spaced a third, greater distance from said surface, and,

a second connector body matable with said first connector body, said second connector body having a latching member thereon that moves said arm temporarily to substantially its release position as said connector bodies are moved together before latching with said arm latching end at a fully mated position, thereby providing a lock that is releasable by pressing said arm operating end to said second distance, the improvement comprising,

a connector position assurance and assist device including a blocking end having a thickness substantially equal to said third distance, so that, when said connector bodies are fully mated, said blocking end may be pushed between said arm operating end projection and said surface, moving said arm to its biased position before said arm returns to its free state position and traps said blocking end with said projection, thereby disabling said arm operating end from releasing said lock and assuring that said connector bodies remain fully mated, said blocking end thickness also assuring that, when said connector bodies are only partially mated and said arm is therefore held substantially in its release position, said blocking end may not be pushed between said arm operating end projection and said surface without imposing a force on said first connector body that first moves and assists said first and second connector bodies together to the fully mated position.

4,708,414

ELECTRIC WIRE CONNECTOR FOR COAXIAL CABLE

Albert Lam, 16Fl., BK40, 550 Victoria Road, Hong Kong, Hong Kong

Filed Jan. 30, 1987, Ser. No. 8,829
Int. Cl.[4] H01R *4/24*
U.S. Cl. 439—394 **8 Claims**

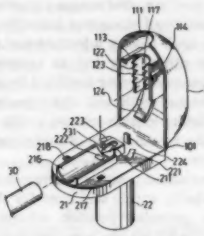
1. An electric wire connector used for a coaxial cable having an inner conductor and and an outer conductor;

a base member having a trough thereon for receiving the coaxial cable, and a first engaging means;

a conductive sleeve secured to said base member and having a contact portion extending near said trough;

a conductive pin plug disposed in said sleeve, secured to said base member and having a contact portion extending near said trough for contacting the inner conductor of the coaxial cable;

a press cover for covering said base member having one side hinged to said base member, an access to said trough, and a second engaging means to engage with said first engaging member when said press cover is pressed against said base member; and



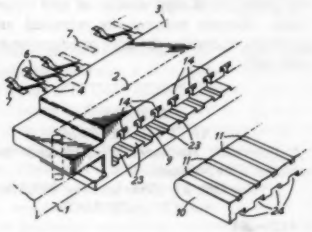
a serrated penetrating member attached to the inner side of said press cover, and having a serrated edge to penetrate into the coaxial cable so as to contact the outer conductor of the coaxial cable, and a contact end abutting with said contact portion of said sleeve member.

4,708,415

ELECTRICAL CONNECTORS

Rowland S. White, Hampshire, England, assignor to Amphenol Corporation, Wallingford, Conn.

Filed Apr. 24, 1986, Ser. No. 855,272
Claims priority, application United Kingdom, Apr. 29, 1985, 8510840
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—633 **9 Claims**



1. A multi-contact electrical connector for making connection to an edge of a printed circuit board having a plurality of surface contacts on a first surface thereof, said connector comprising

a housing having a first end adapted to receive a mating connector having electrical contacts and a second end adapted to receive said edge of said circuit board, said first end having a forward face and said second end having a back face,

a plurality of contact receiving cavities in said housing, each of said cavities comprising a first slot extending in an inner wall of said housing and a second slot connected to said first slot and arranged substantially perpendicular to the plane of said first slot, both said first and second slots extending from said forward face of said first end of said housing to said back face of said second end of said housing,

a connector receiving cavity extending inwardly from said forward face to receive said mating connector,

a plurality of side-by-side spaced strip-like resilient contact elements received in said housing with respective elements being received in respect ones of said contact receiving cavities,

each of said contact elements having an innermost end, an

inner portion connected to and being narrower than said innermost end, an intermediate portion connected to and being wider than said inner portion, and an outer portion connected to said intermediate portion and adapted to bear against respective ones of said surface contacts of said circuit board,

said contact elements being mounted in said contact receiving cavities such that said innermost end is slidingly located in said first slot adjacent to said forward face of said housing, said inner portion being slidingly acceptable in said second slot and extending downwardly from said innermost end, said inner portion having a substantially U-shape and extending into said connector receiving cavity and engageable with said contacts of said mating connector, said intermediate portion of said contact element being received in said first slot, retaining means on said intermediate portion to retain said contact element in its respective contact receiving cavity, a part of said intermediate portion extending outwardly of said housing and being in abutment with said back face of said housing, and said outward portion of said contact element extending downwardly from said part of said intermediate portion and having a substantially U-shape for engagement with a respective one of said surface contacts of said circuit board.

4,708,416

ELECTRICAL CONNECTING TERMINAL FOR A CONNECTOR

Yoshiyuki Awano, Kawasaki, Japan, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 816,845, Jan. 7, 1986, abandoned. This application Apr. 10, 1987, Ser. No. 37,131

Claims priority, application Japan, Feb. 15, 1985, 60-19049[U]

Int. Cl.[4] H01R *13/11*

U.S. Cl. 439—851 **9 Claims**

1. A terminal for an electrical connector comprising:

an elongated flat base having a female contact member at one end and a terminal portion at the other end;

a pair of opposing support sections extending upward from opposite lateral side edges at said one end of the flat base and defining an opening for insertion of a male pin into said female contact member;

a pair of opposing elastic contact sections extending from opposite corresponding side edges of said support sections, facing in a direction toward said other end of the flat base, said elastic contact sections extending rearward along said flat base and having distal ends pointing in a direction toward said other end of the flat base;

a pair of opposing engaging sections extending upward from said flat base and disposed at position intermediate the ends of said flat base, said distal ends of the rearward extending contact sections being adjacent to said engaging sections;

at least one wrinkle formed in a portion of said flat base between the support sections and the engaging sections, said base portion having a length prior to the formation of the wrinkle approximately equal to the length of the contact sections, said wrinkle having a projecting surface and a recessed surface and contracting the length of said flat base portion by a predetermined distance sufficient to move the distal ends of said elastic contact sections forward to a position between said pair of opposing engaging sections so that said engaging sections can restrict outward deformation of said elastic contact sections when a male pin is inserted therebetween.

4,708,417

THREADLESS ELECTRIC TERMINAL

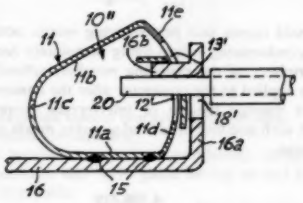
Hans Woertz, Basel, Switzerland, assignor to Oskar Woertz, Inhaber Hans Woertz, Muttenz, Switzerland

Filed Sep. 24, 1986, Ser. No. 911,158

Claims priority, application Switzerland, Oct. 9, 1985, 4348/85

Int. Cl.[4] H01R *9/00*

U.S. Cl. 439—828 **1 Claim**



1. A threadless electric terminal, comprising an electric current conducting support and control element, at least one substantially V-shaped plate of spring material forming a V-spring, said plate having a pair of angularly spaced wing sections joined together to from a vertex at one end, a first of said wing sections being attached to said contact element, overlapping arms at opposite ends of said wing sections, said element having a flange lying parallel to said arm of said first wing section, said flange defining a space with said arm of said first wing section, said arms respectively having openings therein spaced from terminal ends of said respective arms such that an end portion of one of said arms at least partially blocks said opening in the other of said arms in an initial condition of said spring, said wing sections being resiliently movable relatively toward one another from said initial condition into a spring loaded condition in response to an external force applied to at least one of said wing sections for aligning said openings with one another for the reception of an elongated electric conductor, said arm of the second of said wing sections overlying said arm of said first wing section and being movable in said space in said spring loaded condition, said flange having an opening therein which at least partially aligns with said opening in said arm of said first wing section such that the conductor may extend through said openings when aligned in said spring loaded condition, said flange having a lug extending through said openings in said arms in said initial condition, and said wing sections being resiliently urged away from one another during said spring loaded condition upon release of said external force for clamping the conductor to said V-spring and to said lug as opposing edges of said openings resiliently engage the conductor.

4,708,418

ELECTRICAL CONNECTION

Johnny F. Reyna, 1001 Whitehall Dr., Plano, Tex. 75023

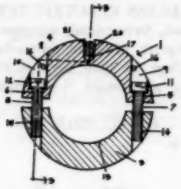
Filed Feb. 27, 1986, Ser. No. 833,240

Int. Cl.[4] H01R *4/46*

U.S. Cl. 439—785 **29 Claims**

1. An electrical connector comprising first and second relatively movable clamping members, each clamping member having a concave inner surface forming a seat for engagement with an electrical conductor, said clamping member being secured together by a first securing means adjacent one side of

the seats and by an actuating means adjacent the opposite side of the seats, said actuating means being adapted to draw the clamping members toward each other whereby a conductor may be firmly gripped within the seats, a recess formed in one of the clamping members for receiving a second conductor and second securing means for firmly securing the second conductor in said recess, said first securing means, actuating means and secondsecuring means being completely recessed within the periphery of the clamping members whereby insulation may be applied to the connector after the connection is made without damage thereto or interference therewith due to contact with said first or second securing means or said actuating means.



4,708,419

PROTECTION OF IR SENSITIVE EQUIPMENT

Werner Scherber, Bermatingen, and Hans W. Schroeder, Immenstaad, both of Fed. Rep. of Germany, assignors to Dornier System GmbH, Friedrichshafen, Fed. Rep. of Germany

Filed Sep. 12, 1984, Ser. No. 649,817

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1983, 3333165; Mar. 22, 1984, 3410502; Apr. 28, 1984, 3415974

Int. Cl.[4] G02B *5/00*

U.S. Cl. 350—1.1 **6 Claims**

1. The method of protecting infrared equipment in aircraft against rain erosion, the equipment being sensitive to radiation in the range from 8 to 13.5 micrometer wavelength, comprising the step of using a cover or window transmissive to radiation in said wavelength range and consisting of a thermoplastic synthetic selected from the group consisting of polyetheretherketone, perfluoroalkoxy copolymer, polyethersulfone, polyacetal, polyamide.

4,708,420

FOCAL PLANE SCANNING DEVICE

Kevin Liddiard, Fairview Park, Australia, assignor to The Commonwealth of Australia, Canberra, Australia

PCT No. PCT/AU85/00110, § 371 Date Jan. 14, 1986, § 102(e) Date Jan. 14, 1986, PCT Pub. No. WO85/05464, PCT Pub. Date Dec. 5, 1985

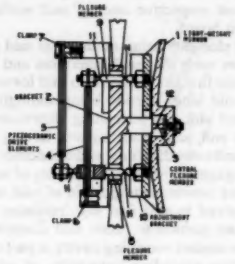
PCT Filed May 17, 1985, Ser. No. 829,133

Claims priority, application Australia, May 24, 1984, PG5164

Int. Cl.[4] G02B *26/10*

U.S. Cl. 350—6.6 **8 Claims**

1. A focal plane scanning device arranged to move a mirror in an optical scanning device such as an infrared scanner wherein the mirror is mounted to be angularly displaced by means of a piezoelectric assembly comprising a piezoelectric member connected to said mirror by means of a first flexure member to support said mirror on a support bracket to allow the mirror to be tilted about a selected axis relative to said support bracket and a piezoelectric drive element carried on said support and connected to said mirror, characterized by a pair of piezoceramic elements arranged generally parallel to the plane of said mirror, each piezoelectric element connected at one end to said support bracket and extending in opposite directions past a first flexure member which supports said mirror, and by flexure members, one on the other end of each of said piezoceramic elements, connecting that piezoceramic element to said mirror remote from said first flexure member, whereby a balanced movement of said mirror about said first flexure member results when at least one of said piezoceramic members is energized.



4,708,421

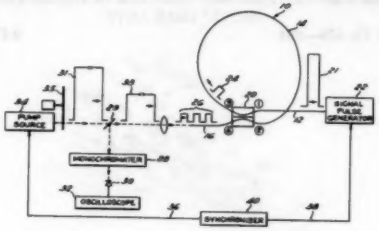
IN-LINE FIBER OPTIC MEMORY

Emmanuel Desurvire, Menlo Park; Michel J. F. Digonnet, Palo Alto, and H. J. Shaw, Stanford, all of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Feb. 8, 1985, Ser. No. 699,853

Int. Cl.[4] G02B *5/172*

U.S. Cl. 350—96.15 **25 Claims**



1. A fiber optic recirculating memory, comprising:

a length of optical fiber, for receiving an optical signal pulse, said fiber forming a loop;

an optical coupler for optically closing said loop and for coupling said optical signal pulse to said loop to provide a circulating optical signal pulse which makes plural circulations in said loop, said coupler additionally outputting a portion of said circulating signal pulse from said loop on each of plural circulations to provide a series of output pulses; and

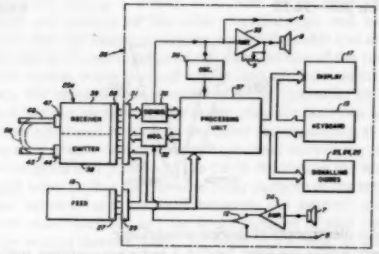
a light source for generating an input pump signal, said coupler coupling said pump signal to said fiber loop, the intensity of the pump signal being selected to cause stimulated scattering in said loop to generate photons in said loop for amplification of said circulating signal during each of said plural circulations, the optical wavelength of said pump signal and said optical signal pulse selected such that said photons have the same optical wavelength as said optical signal pulse, the coupling ratio of said coupler and the optical power of said pump signal selected such that said amplification of said circulating signal pulse compensates for the total round-trip losses of said circulating optical signal pulse on each of said plural circulations to cause said output pulses to be substantially constant in amplitude.

4,708,422

MULTI-WAVELENGTH LIGHT EMITTING AND RECEIVING APPARATUS FOR MONITORING CONNECTIONS BY OPTICAL FIBERS

Daniel Arnoux, Portsmouth, N.H.; Claude Genter, and Christian Anton, both of Paris, France, assignors to Societe Chauvin Arnoux, Paris, France

Filed Sep. 6, 1985, Ser. No. 774,715
Claims priority, application France, Jan. 14, 1985, 85 00424
Int. Cl.[4] G02B 6/42; G01N 21/88
U.S. Cl. 350—96.15 8 Claims



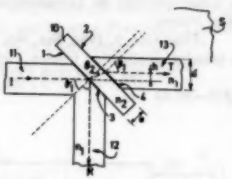
1. Multi-wavelength light emitting and receiving apparatus for monitoring connections by optical fibers, comprised of a case (1*a*, 1*b*), an emission section (38) containing a closed-loop controlled current source (41) and at least one light-emitting diode (42) connected to the closed-loop controlled current source, a receiving section (39) containing a photoreceiver (46), having a spectral window covering that of the light-emitting diode, and and amplifier (49) connected to the output of the photoreceiver, a keyboard (15) for selecting the operating modes and the measurement scales, a display device (17), a processing unit (37) with a microprocessor (66) connected to the closed-loop controlled current source of the emission section, to the amplifier of the receiving section, to the keyboard and to the display device, and a feed (19) capable of furnishing the continuous voltages necessary for the functioning of the apparatus, characterized in that the light-emitting diode (42), the closed-loop controlled current source (41), the photoreceiver (46) and the amplifier (49) are mounted in a drawer (20*a*) equipped with a connector (28) that can be inserted in a complementary connector (31) provided in the case, this latter containing the keyboard (15), the display device (17), the processing unit (37) and the feed (19), in that it also includes at least one more drawer (20*b*) provided with a connector that can be inserted into the said complementary connector (31) of the case and containing another closed-loop controlled current source, another light-emitting diode having an emission wavelength different from that of the first light-emitting diode and connected to the other closed-loop controlled current source, another photoreceiver having a spectral window covering that of the other light-emitting diode, and another amplifier connected to the output of the other photoreceiver, and in that each amplifier has a gain adapted to the response of the photoreceiver associated with it at the wavelength emitted by the emitting diode situated in the corresponding drawer, such that at identical levels of light power respectively emitted by the emitting diodes and respectively received by the photoreceivers the amplifiers deliver output signals having identical levels.

4,708,423

OPTICAL WAVE GUIDES AND COUPLING MEMBER MONOLITHICALLY INTEGRATED ON A SEMICONDUCTOR SUBSTRATE

Marko Erman, Paris; Jean-Bernard Theeten, Ozoir-la-Ferriere, and Nakita Vodjdani, Paris, all of France, assignors to U.S. Philips Corp., New York, N.Y.

Filed Sep. 9, 1985, Ser. No. 773,701
Claims priority, application France, Sep. 25, 1984, 84 14683
Int. Cl.[4] G02B 6/10
U.S. Cl. 350—96.15 25 Claims



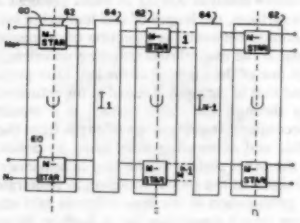
1. An integrated optical component comprising:
a semiconductor substrate;
an input optical wave guide monolithically integrated with the substrate, said wave guide having an end face and a refractive index;
an output optical wave guide monolithically integrated with the substrate, said wave guide having an end face and a refractive index;
a plate monolithically integrated with the substrate, said plate having a refractive index different from that of the input optical wave guide, said plate having first and second opposite parallel surfaces arranged perpendicular to the substrate, said first plate surface contacting the end face of the input optical wave guide, said second plate surface contacting the end face of the output optical wave guide; and
a light source monolithically integrated with the substrate, said light source being optically coupled to the input optical wave guide.

4,708,424

TRANSMISSIVE SINGLE-MODE FIBER OPTICS STAR NETWORK

Michel Marhic, Evanston, Ill., assignor to Northwestern University, Evanston, Ill.

Filed Sep. 21, 1984, Ser. No. 652,721
Int. Cl.[4] G02B 6/28
U.S. Cl. 350—96.16 10 Claims



1. A method of constructing a single-mode fiber optics 2N-star coupler free from multi-path interference utilizing 2-star fiber optics couplers having two inputs and two outputs where $N=2^n$ and n is an integer, said method beginning with n=1 comprising the steps of:
(a) coupling an output of a first N-star coupler and a corresponding output of a second N-star coupler to the input of a unique 2-star coupler for each output of said first and

second N-star coupler to obtain an N-star coupler where $2N=2^{n+1}$;

(b) repeating step (a) at least once utilizing 2N-stars constructed according to the previous repetition as the N-stars until the desired star size is reached.

4,708,425

BIDIRECTIONAL OPTICAL WAVELENGTH MULTIPLEXER-DEMULTIPLEXER

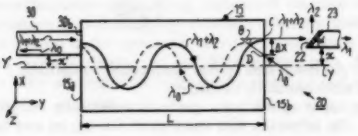
Mohamed Gouali, Paris; Gerald Roullet, Igny, and Oliver Voisin, Conflans Ste Honorine, all of France, assignors to Lignes Telegraphiques et Telephoniques Ltt, Conflans Ste Honorine, France

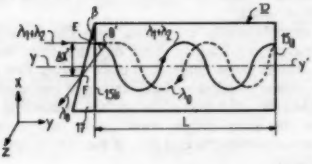
Filed Oct. 9, 1984, Ser. No. 658,688

Claims priority, application France, Oct. 11, 1983, 83 16138

Int. Cl.[4] G02B *6/28*

U.S. Cl. 350—96.16 **12 Claims**





7. A wavelength demultiplexer for bidirectional connection, comprising an optical connecting fibre transmitting an optical signal of at least two multiplexed outgoing wavelengths in one direction, and intended for transmission in the other direction of an optical signal of at least one return wavelength, said connecting fibre having a surface acting as an output surface for the outgoing wavelengths and at the same time as an input surface for the return wavelength, optical filtering means for demultiplexing the outgoing wavelengths transmitted by the fibre, a self-focusing lens situated between the output-input surface of the fibre and the input side of said optical filtering means and which receives the signal of multiplexed outgoing wavelengths, in the form of a cylindrical bar of a given length and of refractive material having an index gradient and delimited by two surfaces, the length of said lens being such that the spatial separation between the direction of propagation of the optical signal at the multiplexed outgoing wavelengths emerging through one of the surfaces of the lens after propagation in the same and that of the optical signal at the return wavelength penetrating through this same surface is a maximum, thus enabling decoupling the return wavelength from the outgoing wavelengths, said connecting fibre being so positioned with respect to the other surface of the lens in a manner such that the optical signal at the return wavelength penetrates into the fibre after propagation in the lens, wherein said self-focusing lens of given length comprises, on its surface through which emerges the optical signal at the multiplexed outgoing wavelengths after propagation in the lens and through which enters the optical signal at the return wavelength, a prism having as its cross-section a right-angled triangle of which the hypotenuse subtends a given angle with a selected other side of the triangle affixed to the entire said surface of the lens, each optical signal passing through said prism, thus enabling securing a maximum spatial separation between the direction of propagation of the optical signal at the multiplexed outgoing wavelengths emerging from the prism after propagation in the lens and that of the optical signal at the return wavelength penetrating into the prism.

4,708,426

ELECTRO-OPTICAL DEVICE COMPRISING A LASER DIODE, AND INPUT TRANSMISSION FIBRE AND AN OUTPUT TRANSMISSION FIBRE

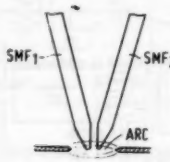
Giok D. Khoe, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed Jul. 2, 1985, Ser. No. 751,416

Claims priority, application Netherlands, Jul. 9, 1984, 8402168; Dec. 24, 1984, 8403931

Int. Cl.[4] G02B *6/32, 6/26*

U.S. Cl. 350—96.18 **4 Claims**



1. An electrooptical device comprising:

a semiconductor laser having a radiation-emitting surface;

at least two single mode optical transmission fibers having first and second ends, said first ends being coupled to the radiation-emitting surface of the laser, said first ends forming a tapered composite fiber with a composite end face;

a transparent material provided on the composite end face, said transparent material having a spherical surface;

an optical source coupled to the second end of one fiber; and

an optical receiver coupled to the second end of the other fiber.

4,708,427

OPTICAL SUBMARINE CABLE CONNECTION

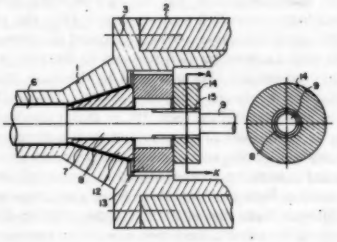
Yoshihiro Ejiri; Akira Nagai, both of Tokyo; Taiichiro Nakai, Fujisawa, and Yasuhiko Niiro, Yokohama, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Filed May 21, 1985, Ser. No. 736,463

Claims priority, application Japan, May 25, 1984, 59-104641

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.20 **9 Claims**



1. A cable anchoring structure for connecting an optical submarine cable to an optical submarine repeater or optical cable connecting joint box or the like having a metallic casing, the submarine cable being of the type having a core optical unit housing at least one optical fiber longitudinally therein, multiple layers about the core optical fiber unit comprising a pressure proof layer about the core optical fiber unit consisting of a longitudinally split metallic conductive pipe split into three

sectors cross sectionally, a layer of a multiplicity of tensile-strength wires disposed circumferentially about the metallic conductive pipe and a metallic tape welded defining a tube over the wires circumferentially thereof and an outer insulator layer, the cable when prepared for connection having an end portion stripped to the layer of tensile-strength wires, the cable anchoring structure comprising a tubular bearing member connected in use to said casing and having a conical interior section for receiving the stripped end portion of the cable inserted therein extending therethrough, the conical interior section having conical inner surfaces converging axially in a direction axially away from the stripped end portion of the cable when said stripped end portion of the cable is inserted into the conical interior section, a tapered anchor member insertable wedged in the conical interior section of the bearing member and having a central axial bore for insertion of the stripped end portion of the cable therethrough and having tapered outer surfaces converging toward the cable and axially in a direction of convergence of the inner surface of the conical interior section when inserted axially into said conical interior section, the tapered anchor member being insertable into the conical interior section axially under pressure between layers of the stripped end portion of the cable for separating at least the layer of tensile-strength wires from other underlying layers of the stripped end portion of the cable deforming the tensile-strength wires so that they overlie outer surfaces of the tapered anchor member and are held between the tapered anchor member outer surfaces and the inner surfaces of said conical interior section thereby fixing the cable to a casing, an anchor nut through which the stripped end portion of the cable is insertable, the anchor nut having an external thread for threading thereof on an internal thread of the bearing member in position for mounting the anchor nut abutting the tapered anchor member and holding it axially wedged in position in the conical interior section of the bearing member to preclude axial movement thereof axially away from the inner surfaces of the conical interior section of the bearing member thereby holding the layer of tensile-strength wires securely between said tapered outer surfaces and said conical inner surfaces.

4,708,428

LIGHT WAVEGUIDE CONNECTOR

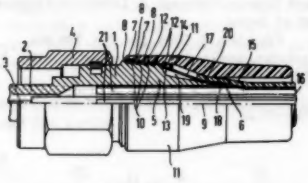
Herbert Loeffler, and Peter Preiner, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jan. 22, 1986, Ser. No. 821,372

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1985, 3514075

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.20 **6 Claims**



1. A light waveguide connector having a cable end and a plug end, with a hollow-cylindrical extension provided at the cable end of the connector and a clamping sleeve which can be pushed over said extension, both the extension on an outside of the extension, and the clamping sleeve on an inside of the sleeve being equipped, at least in a partial area respectively with grooves oriented mainly transverse to a longitudinal axis of the connector, characterized in that the clamping sleeve, at least in a groove area, is designed so as to be elastically expandable, limiting walls of the grooves of the clamping sleeve being complementary to limiting walls of the grooves of the extension so that the grooves of the clamping sleeve when the sleeve is pushed over the extension mesh with the grooves of the extension and further characterized in that an end section of a strength member of a light waveguide cable consisting of a fiber layer located under a jacket of the cable is placed over a groove area of the extension, whereupon the clamping sleeve, previously provided with the grooves is disposed with the groove area on the groove area of the extension covered by the fiber layer.

4,708,429

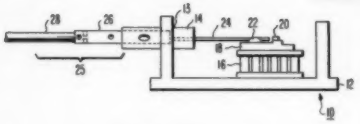
OPTICAL FIBER ASSEMBLY AND OPTICALLY COUPLED DEVICE PACKAGE INCLUDING SAME

David W. Clark, Lititz, and Morton Freedman, Lancaster, both of Pa., assignors to RCA Corporation, Del.

Filed Sep. 26, 1985, Ser. No. 780,311

Int. Cl.[4] G02B *7/26*

U.S. Cl. 350—96.20 **30 Claims**



1. An optical fiber assembly comprising:

a support sleeve comprising a body with an opening extending axially therethrough and a plurality of anchor holes near a first end extending from said opening through the sides of said sleeve; and,

an optical cable, inserted into said first end, including a first portion comprising a protective coating overlying an optical fiber and a second portion comprising a bare optical fiber extending from said coating, said protective coating extending within said support sleeve beneath the anchor holes, the protective coating including nodules formed integrally with said protective coating to extend into the anchor holes securing said cable to said support sleeve.

4,708,430

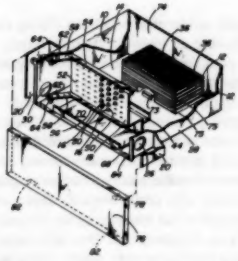
CABINET FOR OPTICAL CABLE TERMINATING EQUIPMENT

Michael J. Donaldson, Ottawa; James D. Pue-Gilchrist, Richmond, and James R. Scott, Ashton, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Oct. 29, 1984, Ser. No. 665,636

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.20 **8 Claims**



1. An apparatus comprising:

a cabinet;

a removable cover for enclosing the cabinet at the front of the cabinet;

a stack of optical splice organizing trays removably mounted at a rear portion of the cabinet;

cable entry and cable exit openings formed, respectively, in opposed sides of the cabinet;

a panel mounted within the cabinet and pivotable about a vertical axis at a front portion of the cabinet to expose the stack of splica organizing trays, the panel being movable from a first position across the cabinet to a second position providing an opening to remove the splice organizing trays such that access to the splice organizing trays can be had through the front of the cabinet when the cover is removed and the panel is moved to its second position; and

an array of optical connectors mounted on the panel such that said optical connectors move with said panel, said optical connectors extending through said panel such that opposite sides of said optical connectors are exposed when said panel is moved from said first position to said second position.

4,708,431

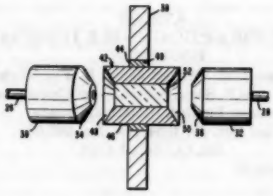
FIBER OPTIC SOLDERABLE BULKHEAD FITTING

Joseph L. Pikulski, Thousand Oaks, and O. Glenn Ramer, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 572,731, Jan. 20, 1984, abandoned. This application Oct. 3, 1985, Ser. No. 783,515

Int. Cl.[4] G02B 7/26

U.S. Cl. 350—96.20 **2 Claims**



1. A fiber optic solderable bulkhead fitting comprising:

a bulkhead having an opening therethrough;

a connector positioned within said opening and sealed with respect thereto, said connector having end faces positioned on opposite sides of said bulkhead;

a member having optical transmissivity extending through said connector and terminating in said end faces;

first and second optical fibers each having an end; and

first and second metallic built-up bodies respectively on said fibers adjacent the ends thereof, said metallic built-up bodies being of a fine metallic grain structure to minimize microbending of said optical fiber and being of a thickness to provide a rigid structure which is resistant to engagement forces with said connector, said bodies each having a mating surface thereon so that when said metallic built-up bodies are engaged with said end faces on said connector, said optical fibers are in optical communication through said member having optical transmissivity.

4,708,432

FIBER OPTIC CONNECTOR INCLUDING AUTOMATIC WIPING MECHANISM

Arne Berg, Kattem, Norway, assignor to Stiftelsen for Industriell og Teknisk Forskning ved Norges Tekniske Hogskle (SINTEF), Trondheim, Norway

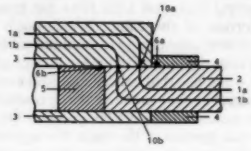
PCT No. PCT/NO84/00030, § 371 Date Apr. 2, 1985, § 102(e) Date Apr. 2, 1985, PCT Pub. No. WO85/00899, PCT Pub. Date Feb. 28, 1985

PCT Filed Aug. 9, 1984, Ser. No. 718,775

Claims priority, application Norway, Aug. 11, 1983, 832882

Int. Cl.[4] G02B 6/38

U.S. Cl. 350—96.21 **12 Claims**



1. In a fiber optic connector comprising two cooperating connector parts each being provided with a cover for protection in a disconnected condition of the connector, whereby the mating of the connector parts for mutual coupling therebetween causes movement of said covers so that there is established at least one continuous optical light path through the connector, the improvement wherein:

said at least one optical light path includes optical fibers permanently extended to a surface on each said connector part;

said surfaces on said connector parts slide against each other during movement to couple said connector parts thereby forming interfacing surfaces;

said covers slide over respective said interfacing surfaces during said movement; and

each said cover has a wiper element adapted to clean a tip of said optical fiber at the said interfacing surface of the respective said connector part when said cover is moved.

4,708,433

OPTICAL CONNECTOR AND METHOD OF MANUFACTURING A PAIR OF FERRULES THEREFOR

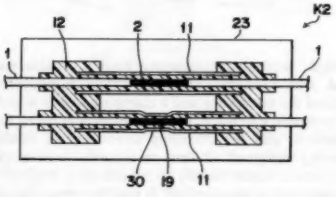
Toshiaki Kakii; Koichiro Matsuno; Shuzo Suzuki, all of Yokohama; Fumihiro Ashiya, and Koushi Ishihara, both of Mito, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka and Nippon Telegraph & Telephone Corporation, Tokyo, both of, Japan

Filed Sep. 4, 1985, Ser. No. 788,404

Claims priority, application Japan, Sep. 4, 1984, 59-186135; Sep. 4, 1984, 59-186136

Int. Cl.[4] G02B 6/40, 6/38

U.S. Cl. 350—96.22 **5 Claims**



1. A multi-fiber connector for joining exposed fiber ends of multicore coated fibers each having multiple optical fibers, comprising:

a pair of ferrules each of which includes a plurality of said multicore coated fibers and a plurality of metal pipes molded integrally with each other by using molding resin such that said metal pipes act as a plurality of coupling portions of each of said ferrules, respectively;

said multicore coated fibers being, respectively, extended through said metal pipes such that said exposed fiber ends of each of said multicore coated fibers are disposed at a distal end of each of said metal pipes;

a plurality of sleeves into which said metal pipes of one of said ferrules and said metal pipes of the other one of said ferrules are fitted from opposite ends of said sleeves, respectively; and

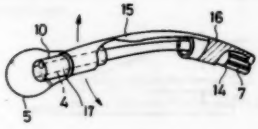
a housing member for axially clamping said ferrules to each other.

4,708,434

FIBERSCOPE WITH BENDING MECHANISM

Koichi Tsuno, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed May 30, 1985, Ser. No. 739,258
Claims priority, application Japan, May 30, 1984, 59-112123
Int. Cl.⁴ G02B *23/26*
U.S. Cl. 350—96.26 **7 Claims**



1. A fiberscope comprising a cover tube, an image fiber disposed within said cover tube and a bending mechanism adjacent a forward end of the fiber scope, said bending mechanism including a first cylindrical cast section having passage means for said fiber partially secured to said cover tube, a second cylindrical cast section having passage means for said fiber secured at the forward end of the fiberscope, and a rubber tube of resilient material having greater flexibility than said cover tube secured on said first section adjacent one end of said rubber tube and secured on said second section adjacent the other end of said rubber tube with the second section being disposed in spaced relation from said first section, said image fiber having an image lens secured on an end thereof adjacent said second section and said fiberscope further comprising light guide means for transmitting illuminating light and manipulating wires extending through said cover tube, said rubber tube and said cast sections with said manipulating wires being secured to said second cast section to move said second section relative to said first section.

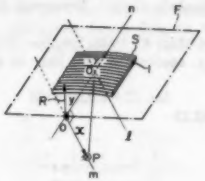
4,708,435

REAR PROJECTION SCREEN

Yukio Yata, Chiba, and Shingo Suzuki, Zama, both of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Oct. 30, 1986, Ser. No. 925,723
Int. Cl.⁴ G03B *21/60, 21/22, 21/28*
U.S. Cl. 350—129 **13 Claims**

1. A rear projection screen in which a light is introduced from a rear surface at a sharp angle for viewing an image, comprising a plurality of prisms extending along lines or circular arcs provided on said rear surface, and each prism constituting said prisms has a total reflection surface which totally reflects the incident light and emerges to a viewing side, said total reflection surface and/or the surface opposite to said total reflection surface having curved surface so that the luminous



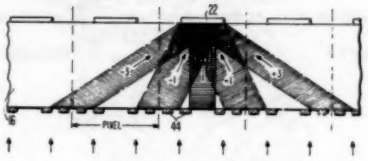
flux of the totally reflected light, is converged and then diffused.

4,708,436

OPTICAL IMAGER WITH DIFFRACTIVE LENTICULAR ARRAY

Hans P. Kleinknecht, Bergdietikon, Switzerland, assignor to RCA Corporation, Princeton, N.J.

Filed Jul. 12, 1985, Ser. No. 754,134
Int. Cl.⁴ G02B *5/18, 27/44;* H01J *40/14;* H04N *3/14*
U.S. Cl. 350—162.17 **15 Claims**



1. An optical imager comprising:

a substrate of semiconductor material having a pair of opposed major surfaces;

a plurality of radiation detectors which are arranged in a plurality of evenly spaced parallel columns along one of said major surfaces, with each of said detectors being capable of converting radiation to electrons; and

a diffractive lenticular array along the other major surface of the substrate, said lenticular array including a plurality of diffractive lines parallel to said columns of radiation detectors, said diffractive lines having line widths, spacings and thickness such as to suppress even orders of diffraction including the zeroeth order, thus to direct the radiation impinging on each of the diffraction gratings these diffractive lines form to the detectors in a plurality of said columns and away from between any of these columns.

4,708,437

INCIDENT-LIGHT PHASE GRID AND METHOD FOR MAKING SAME

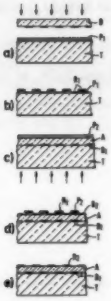
Heinz Kraus, Traunreut, Fed. Rep. of Germany, assignor to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

Filed Mar. 27, 1985, Ser. No. 716,396

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1984, 3412980

Int. Cl.[4] G02B *5/18*

U.S. Cl. 350—162.23 23 Claims



1. An incident-light phase grid comprising:

a transparent spacer layer; and

first and second reflecting layers, each arranged on a respective side of the spacer layer, at least one of the two reflecting layers defining an amplitude grid.

4,708,438

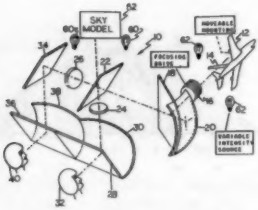
OPTICAL VISUAL SIMULATION SYSTEM

Joseph A. LaRussa, Yorktown Heights, and Martin Shenker, Pomona, both of N.Y., assignors to Farrand Optical Co., Inc., Valhalla, N.Y.

Filed May 11, 1984, Ser. No. 609,468

Int. Cl.[4] G02B *27/14*

U.S. Cl. 350—174 22 Claims



1. An optical display system comprising:

(a) a model of an object whose visual appearance is to be simulated;

(b) means for illuminating said model;

(c) means for moving said model to a desired position; and

(d) optical coupling means for conveying an image of said model to an observer, said moving means moving said model to a position where its apparent size as perceived by said observer viewing said model through said optical coupling means has a desired value, the optical axis of said optical coupling means having at least one fold said optical coupling means, comprising:

(i) first telescope means having a first power; and

(ii) second telescope means having a second power, said second telescope means being positioned in cascade with said first telescope means, said first telescope means being adjacent said model and said second telescope means having two halves with substantially the same magnification but having different path lengths and path positions for bringing an image of the model to two different observers in two different positions and wherein the optical train of both of said first and second telescope means includes a beamsplitter, background information is introduced into both of said telescope means by said beamsplitter, and said background information emanates from a sky model.

4,708,439

LIQUID CRYSTAL DISPLAY DEVICE WITH PRISM FOR VIEWING

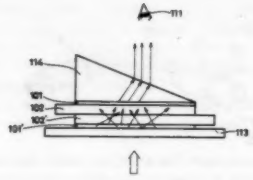
Yutaka Ishii, Nara; Kenichi Nakagawa, Tenri, and Fumiaki Funada, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

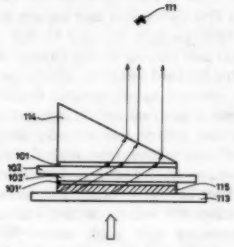
Continuation of Ser. No. 675,855, Nov. 28, 1984, abandoned. This application Feb. 17, 1987, Ser. No. 16,478

Claims priority, application Japan, Nov. 29, 1983, 58-227294

Int. Cl.[4] G02F *1/13;* G02B *17/04*

U.S. Cl. 350—331 R 5 Claims





1. A transmissive type liquid crystal display panel comprising:

light diffusing means for scattering light emitted from a light source;

a liquid crystal cell including,

a liquid crystal material layer, and

front and back polarizing means for polarizing scattered light from said light diffusing means which is incident on said back polarizing means, said liquid crystal material layer being interposed between said front and back polarizing means; and

optical means disposed on a front surface of said liquid crystal cell, for refracting light transmitted through said liquid crystal cell in an oblique direction towards a direction perpendicular to said front surface of said liquid crystal cell,

whereby said light transmitted through said liquid crystal cell in said oblique direction which is refracted provides improved display contrast.

4,708,440

LIQUID CRYSTAL DISPLAY DEVICE

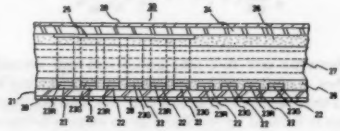
Masaru Kugo, Ibaraki; Hideyuki Ouchi, Yokohama; Kouzou Katogi; Osamu Igarashi, both of Katsuta; Seiji Suda, Mito; Keiichi Tokuyama, Katsuta, and Hirohisa Yamamura, Hitachioota, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 18, 1986, Ser. No. 829,821

Claims priority, application Japan, Feb. 15, 1985, 60-26271; Mar. 22, 1985, 60-55918

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350—339 F 5 Claims



1. A liquid crystal display device provided with a plurality of transparent segment electrodes each having at least one color filter thereon, desired ones of the segment electrodes being selected for display; characterized in that an area of a display surface of said liquid crystal display device except areas of said segment electrodes is formed so as to present a color similar to a color presented by the segment electrodes in an unselected state.

4,708,441

ESTERS

Martin Petrzilka, Kaiseraugst; Martin Schadt, Seltisberg, and Alois Villiger, Basel, all of Switzerland, assignors to Hoffman-La Roche Inc., Nutley, N.J.

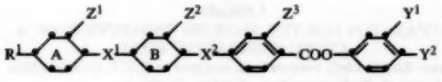
Division of Ser. No. 530,830, Sep. 9, 1983, Pat. No. 4,550,981. This application Aug. 16, 1985, Ser. No. 766,318

Claims priority, application Switzerland, Sep. 30, 1982, 5757/82; Nov. 10, 1982, 6546/82; Jun. 27, 1983, 3499/83

Int. Cl.[4] G02F *1/13*; C09K *19/30, 19/12, 19/20*; C07C *121/52, 54/70, 69/90, 79/26*

U.S. Cl. 350—346 25 Claims

1. A compound of the formula



wherein X^2 is a single covalent bond or —COO—; X^1 is a single covalent bond, —COO—, or $-CH_2CH_2-$; ring A is a benzene ring or trans-1,4-cyclohexylene; ring B is a benzene ring or when X^2 is —COO—, ring B also can be trans-1,4-cyclohexylene; Z^1, Z^2 and Z^3 individually are hydrogen or when positioned on a benzene ring which is not linked directly with a further ring via a single covalent bond, Z^1, Z^2 and Z^3 also can be halogen, cyano or methyl; Y_2 is cyano, nitro, 2,2-dicyanovinyl or when Y^1 is hydrogen Y^2 also can be 2,2-dicyano-1-methylvinyl; Y^1 is halogen, cyano, C_1–C_3-alkyl or when X^1 is —COO— or Y^2 is nitro or at least one of Z^1 and Z^2 is other than hydrogen, Y^1 also can be hydrogen; and R^1 is C_1–C_{12}-alkyl or when positioned on a benzene ring R^1 also can be C_1–C_{12}-alkoxy.

4,708,442

VARIFOCAL LENS SYSTEM

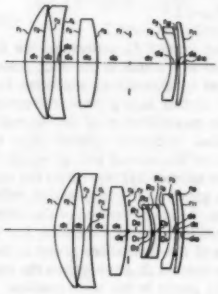
Toru Fujii; Hiroshi Takase, and Masaki Imaizumi, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 20, 1985, Ser. No. 703,540

Claims priority, application Japan, Feb. 22, 1984, 59-32222

Int. Cl.[4] G02B *15/02, 9/34, 9/60*

U.S. Cl. 350—422 4 Claims



1. A varifocal lens system equipped with an auxiliary lens group and comprising a master lens system consisting of a front lens group having positive refractive power and a rear lens group having negative refractive power said groups being relatively movable between first positions corresponding to a long focal length condition and another position where said front lens group is moved toward the image side of the optical path, said auxiliary lens group being removable from the optical path of said master lens system when said master lens system is in said long focal length condition and said auxiliary lens group being insertable between said front and rear lens groups of said master lens system whereupon said front lens group is shifted toward the image side simultaneously with the insertion of said auxiliary lens group.

4,708,443

ZOOM LENS SYSTEM

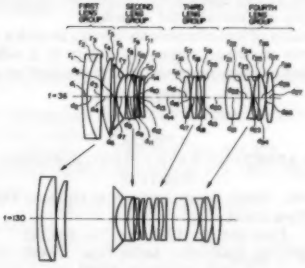
Hisashi Goto, and Yasuji Ogata, both of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 6, 1986, Ser. No. 860,179

Claims priority, application Japan, May 15, 1985, 60-101528

Int. Cl.[4] G02B *15/16*

U.S. Cl. 350—427 5 Claims



1. A zoom lens system comprising a first lens group having positive refractive power and having a focusing function, a second lens group having negative refractive power and having a vari-focal function, a third lens group having positive refractive power and having a vari-focal function, and a fourth lens group having positive refractive power and having a

vari-focal function, wherein said second lens group comprises, in the order from the object side, a negative lens having a surface with strong curvature on the image side, a cemented doublet consisting of a negative lens and positive lens, a negative lens having a surface with strong curvature on the object side, and a positive meniscus lens having a surface with strong curvature on the object side, said zoom lens system fulfilling the conditions (1) through (4) shown below:

(1) $1.6<f_1/f_W<2.0$

(2) $0.4<|f_2|/f_W<0.6$

(3) $2.1<\beta_{2T}/\beta_{2W}<2.4$

(4) $1.5<\beta_{3T}\beta_{4T}/\beta_{3W}\beta_{4W}<1.7$

where, reference symbol f_W represents the focal length of the lens system as a whole in the wide position, reference symbols f_1 and f_2 respectively represent focal lengths of the first and second lens groups, reference symbol β_{2T} represents the magnification of the second lens group in the teleposition, reference symbol β_{2W} represents the magnification of the second lens group in the wide position, reference sybmol β_{3T} represents the magnification of the third lens group in the teleposition, reference symbol β_{3W} represents the magnification of the third lens group in the wide position, reference symbol β_{4T} represents the magnification of the fourth lens group in the teleposition, and reference symbol β_{4W} represents the magnification of the fourth lens group in the wide position.

4,708,444

PHOTOGRAPHIC OBJECTIVE

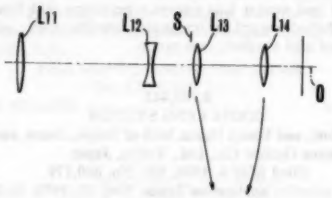
Sadahiko Tsuji, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha

Filed Feb. 22, 1984, Ser. No. 582,457

Claims priority, application Japan, Mar. 1, 1983, 58-33441; Mar. 1, 1983, 58-33442

Int. Cl.[4] G02B *15/22, 9/34, 9/14, 9/10*

U.S. Cl. 350—427 **9 Claims**



1. A photographic objective comprising:

a stop stationary during focusing;

a plurality of lens components located on the image side of said stop and movable for focusing;

said plurality of lens components moving in such a way as to maintain an image point of the stop at a substantially constant position when the stop is assumed as an object point.

4,708,445

LARGE APERTURE RATIO PHOTOGRAPHIC LENS SYSTEM

Hisashi Goto, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

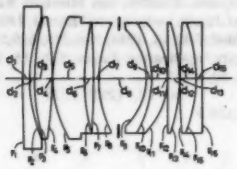
Filed Oct. 29, 1984, Ser. No. 666,282

Claims priority, application Japan, Nov. 7, 1983, 58-207357

Int. Cl.[4] G02B *13/02*

U.S. Cl. 350—454 **10 Claims**

1. A large aperture ratio photographic lens system comprising a first lens group having positive refractive power, a second lens group having negative refractive power, a third lens group comprising a negative lens element arranged in the rearmost position and having positive refractive power, in the order from the object side, and a stop arranged between said second lens group and said third lens group, said large aperture ratio photographic lens system being arranged to advance the lens system as a whole and, at the same time, to increase the



airspace between said first lens group and said second lens group when focusing said photographic lens system on an object at a short distance from the state that said photographic lens system is focused on an object at an infinite distance.

4,708,446

EYEGLASS FRAME AND NASAL CANNULA ASSEMBLY

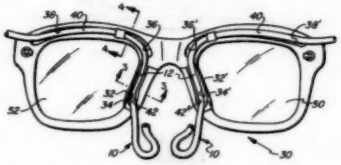
John W. Timmons, and Gloria A. Timmons, both of Sarasota, Fla., assignors to Engineered Specialty Products, Sarasota, Fla.

Filed Dec. 13, 1985, Ser. No. 808,615

The portion of the term of this patent subsequent to Dec. 24, 2002, has been disclaimed.

Int. Cl.[4] G02C *1/00;* **A62B** *9/06*

U.S. Cl. 351—158 **28 Claims**



1. In an eyeglass frame with a concealed nasal cannula assembly, said eyeglass frame having a front piece and a pair of hinged temples, said front piece having a groove in its rear surface for receiving the mid-portion of said cannula assembly, the improvement comprising:

shaped means integrally formed in the lower end of the nasal portion of said cannula assembly for retaining said lower end in the user's nostril by gentle spring biased griping of the ala of the nostril.

4,708,447

APPARATUS FOR THE ENDLESS PROJECTION OF A CINEMATOGRAPHIC FILM

Xaver Kuoni, Lieli, Switzerland, assignor to C.E.T. Construction Eng'g. & Technology Ltd., London, England

PCT No. PCT/CH85/00046, § 371 Date Dec. 18, 1985, § 102(e) Date Dec. 18, 1985, PCT Pub. No. WO85/04263, PCT Pub. Date Sep. 26, 1985

PCT Filed Mar. 19, 1985, Ser. No. 804,644

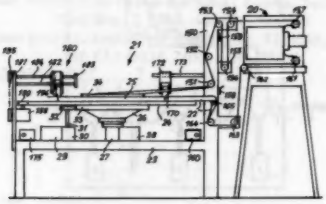
Claims priority, application Switzerland, Mar. 19, 1984, 1375/84

Int. Cl.[4] G03B *21/00*

U.S. Cl. 352—128 **9 Claims**

1. An apparatus for the endless projection of a cinematograhic film, said apparatus comprising a rotatably journalled table for axially supporting a spiral-like film roll, a winding drum coaxially arranged on said table and having an annular support body for radially supporting an innermost winding of said film roll and for defining an interior space in said winding drum, first guide pulleys for continuously delivering the film

from the innermost winding of the film roll for the purpose of feeding the film to a film projector, at least some of said first guide pulleys being located with said space of said winding drum, further guide pulleys for guiding the film coming back from the projector to an outermost winding of the film roll, a sprocket for the film transport located within said interior space of the winding drum; wherein said annular support body of said winding drum has an outer circumference mounting a plurality of pairs of support rollers which are freely rotatable on axles extending in parallel with an axis of the winding drum for frictionless radial supporting of the innermost winding of the film roll; wherein said table has an upper side that includes



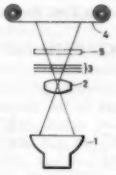
a plurality of freely rotatable support rollers which are rotatable around axles that are oriented in a substantially radial direction with respect to the table for frictionless axial supporting of the film roll; wherein the annular support body of the winding drum is provided with a substantially radial slit for allowing the passage of the film drawn off from the innermost winding of the film roll; wherein separate driving means are provided for respectively rotating the sprocket for the film transport and the table; and including controllable coupling means for selectively coupling the winding drum with a stationary, non-rotatable support member or with the rotatable table, the latter case for the purpose of winding the film onto the winding drum for forming the film roll.

4,708,448

COLOR PICTURE REPRODUCTION WITH CUT-OFF BLUE SPECTRUM

Hitoshi Urabe, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 8, 1986, Ser. No. 883,401
Claims priority, application Japan, Jul. 8, 1985, 60-148192
Int. Cl.[4] G03B *29/00*; G01D *9/42*; H04N *5/84*
U.S. Cl. 354—75 **4 Claims**



1. A method of reproducing a color picture comprising the steps of:

causing a monochromatic CRT having luminance in a blue, a green and a red region to successively emit light on the basis of a blue signal, a green signal, and a red signal for a scene to successively obtain a blue picture, a green picture, and red picture; and

exposing a color photosensitive material successively to light of said blue picture, said green picture, and said red picture through a blue filter, a green filter and red filter respectively;

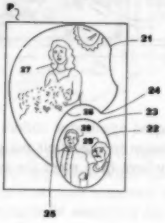
wherein, the exposure by the light of said blue picture is performed in a wavelength region in which a peak of sensitivity to said blue light of a silver halide in said photosensitive material is cut-off in wavelength.

4,708,449

MASK SYSTEM FOR MAKING MULTIPLE PHOTOGRAPHIC EXPOSURES

William C. Thomas, 262 Lakeview Dr., Apt. B, Slidell, La. 70458

Filed Jun. 11, 1986, Ser. No. 872,856
Int. Cl.[4] G03B *11/00*
U.S. Cl. 354—122 **9 Claims**



1. A multi-card masking apparatus for forming multiple exposure photographic images upon film contained in a camera when a photographer sequentially uses the cards, comprising:

a. a plurality of at least first and second darkened slide cards of corresponding size and shape so that a plurality of the cards can be repeatedly manually registered in a precise, preselected "shooting" position with respect to each other by the photographer;

b. a binding that connects the slide cards together along one edge portion of each card;

c. a generally circular first aperture formed in the first of the slide cards;

d. an aperture formed in the second of the slide cards and including a partially circular periphery and a partially concave periphery that nests closely with the first aperture when the cards are superimposed; and

e. registering means for sequentially mounting each card upon the camera in a position that places the apertures in different positions with respect to the film so that multiple exposure photographic images made with the camera have multiple images that occupy different spacial positions ,and wherein the binding is normally positioned by the photographer in an identical "shooting" position with respect to the registering means during use so that the slide cards are accurately positioned when the photographer positions the binding in the shooting position.

4,708,450

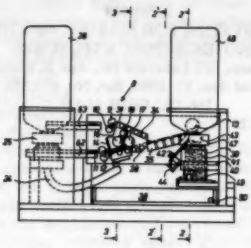
APPARATUS AND METHOD OF DIFFUSION TRANSFER PROCESSING

Herman F. Verbruggen, Zandhoven, Belgium, assignor to Agfa-Gevaert N.V., Mortsel, Belgium

Filed Oct. 7, 1986, Ser. No. 916,176
Claims priority, application European Pat. Off., Oct. 14, 1985, EP85201679.9
Int. Cl.[4] G03D *9/00, 5/06*
U.S. Cl. 354—303 **23 Claims**

1. Apparatus for processing web material according to the DTR process, which apparatus comprises means for transporting and guiding image-wise exposed and image receiving webs along paths in a forward direction, means for applying processing liquid to a first face of each web at locations where their paths are separate, guide means for causing said paths to become contiguous and squeegee rollers for urging the wetted first faces of the webs into intimate contact to initiate diffusion transfer, characterised in that such liquid applying means com-

prises a pair of rollers (18,17) disposed between the web paths (34,28) for applying processing liquid to said first web faces while those faces are in facing relationship, and drive means



(51 to 55) for the liquid applicator rollers (18,17) for driving them in counter-rotation so that their peripheries move in the rearward direction where they meet the web paths.

4,708,451

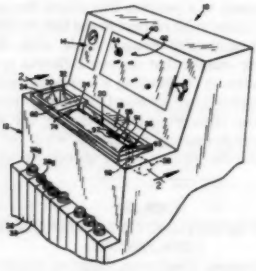
CONTAINER FOR DEVELOPING MACHINE

Ray D. Wing, Lake Oswego; Marine D. Lynch, Beaverton; John A. Rawitzer, Gladstone, and Mark D. Whitney, Aloha, all of Oreg., assignors to Wing-Lynch, Inc., Beaverton, Oreg.

Filed Feb. 5, 1986, Ser. No. 826,195

Int. Cl.[4] G03D *3/06*

U.S. Cl. 354—312 **12 Claims**



1. In an apparatus for developing photosensitive material;

a trough for holding fluid;

removable cover means for closing off said trough to light;

a hollow container for holding material to be processed having a closed condition where the interior is closed to fluid flow and an open condition where the interior is open to fluid flow;

means for mounting the container within the trough;

means for changing the condition of said container from the closed to open and open to closed conditions; and

means for selectively providing fluid flow within said trough and through said container when said container is in an open condition.

4,708,452

DECOATING DEVICE

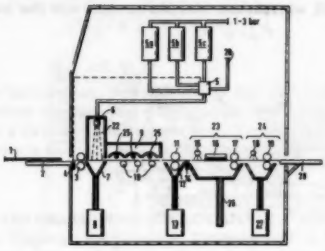
Klaus-Peter Schoen, Wiesbaden, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 14, 1986, Ser. No. 930,525

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1985, 3540588

Int. Cl.[4] G03D *5/04*

U.S. Cl. 354—317 **19 Claims**



1. A decoating device for precoated printing plates developed with liquid toner, comprising: pairs of conveying and squeezing rollers between which the printing plates pass through and a spray device in a spraying section for spraying decoating liquid onto the developed surface of the individual printing plates, wherein the spray device comprises a plurality of containers, filled with different decoating liquids, with the decoating liquids being under pressure, at least one flat-jet nozzle in a spraying section, said nozzle or nozzles being connected to the containers of decoating liquids via at least one valve, wherein a first sensor controls the opening times of the valves in accordance with the format of the printing plate passing through the decoating device, and wherein the spraying section is followed by a heating zone in which the decoating liquid film on the printing plate is heated to facilitate the decoating action.

4,708,453

ARRANGEMENT FOR WET PROCESSING PHOTOSENSITIVE MATERIALS

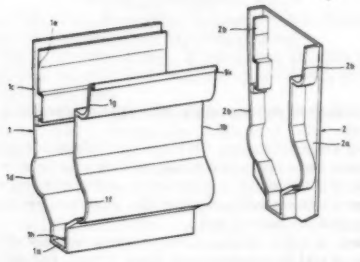
Georg Fryda, and Wilfried Hehn, both of Munich, Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 1, 1986, Ser. No. 913,950

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1985, 3536862

Int. Cl.[4] G03D *3/08*

U.S. Cl. 354—320 **33 Claims**



1. An arrangement for wet processing photosensitive articles, comprising a container for accommodating a processing

bath; and transporting means mountable in said container to advance photosensitive articles through the latter in a first direction transverse to a second direction across the widths of the articles, said container including wall means extending along said second direction, and said wall means comprising at least one first wall constituted by an extrusion, said container further including second walls extending transverse to said second direction and bonded to said wall means.

4,708,454

SHUTTER CONTROL APPARATUS FOR USE IN VARIABLE FOCAL LENGTH CAMERA

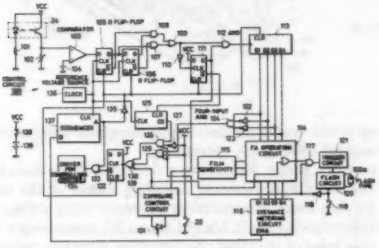
Takanori Kodaira, Tokyo, and Akira Egawa, Machida, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 2, 1986, Ser. No. 936,786

Claims priority, application Japan, Dec. 17, 1985, 60-283767

Int. Cl.[4] G03B *7/00, 3/00, 15/03*

U.S. Cl. 354—422 **8 Claims**



1. A shutter control apparatus for use in a variable focal length camera, comprising:

a lens shutter movable between a fully-opened state and a closed state;

a detecting means for detecting a fully opened state of said lens shutter, said detecting means detecting the state of said shutter in order to detect the fully opened state of said shutter;

a discriminating means for discriminating the focal length of a photographing optical system; and

a control means for closing said lens shutter in response to the detection of the fully opened state of said lens shutter made by said detecting means when said discriminating means determining that said photographing optical system has a long focal length during flash photography.

4,708,455

IMAGE FORMING APPARATUS AND A PROCESS UNIT FOR USE IN THE SAME

Atsushi Kubota, Machida; Shinnosuke Taniishi, Kawasaki; Shinichi Sasaki, Fujisawa; Akiyoshi Kimura, Tokyo, and Michiro Koike, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 533,650, Sep. 19, 1983. This application Feb. 12, 1986, Ser. No. 828,734

Claims priority, application Japan, Sep. 30, 1982, 57-171903; Mar. 10, 1983, 58-39643; Jul. 5, 1983, 58-122045

Int. Cl.[4] G03G *15/00*

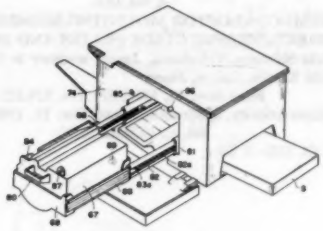
U.S. Cl. 355—3 R **30 Claims**

1. An image forming apparatus, comprising:

unit guide means for supporting a process unit including an image bearing member and process means for acting on said image bearing member, said guide means being movable between an inside position wherein the image bearing member is opposed to optical means to receive image information therethrough and an outside position wherein the guide means is projected out of the apparatus, wherein said unit guide means includes a receiving portion for detachably supporting the process unit, wherein said process unit is adapted to be detached from said unit guide means when in an outside position;

members for positioning said process unit in said apparatus; and

engaging members provided in said process unit, engageable



with said positioning members to correctly position said process unit in said apparatus when said unit guide means supporting said process unit is moved into said apparatus, wherein said engageable members are provided on said process unit at its front side and rear side with respect to the direction of movement of said unit guide means.

4,708,456

METHOD AND APPARATUS FOR FEEDING AND CONVEYING COPYING PAPERS IN A COPYING MACHINE

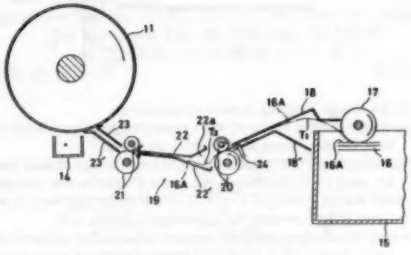
Kiyoshi Shibata, Osaka, and Yutaka Shigemura, Takarazuka, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 699,839, Feb. 8, 1985, abandoned. This application Feb. 27, 1987, Ser. No. 20,206

Claims priority, application Japan, Feb. 18, 1984, 59-31233

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—3 SH **3 Claims**



1. A method of feeding and conveying and correcting a position of an edge of a copying paper for use in a copyng machine provided with at least two pairs of conveying rollers on a conveying passage of said copying paper prior to a transferring process of the copying machine, wherein a paper feeding means and the conveying rollers are driven synchronously with the driving of an optical system of the copying machine so that the position of the top edge of the copying paper is to be at least twice corrected by making the top edge of the copying paper contact the at least two pair of conveying rollers so as to cause the copying paper to make at least two deflections, wherein the copying paper is once deflected while being conveyed by the paper feeding means and one of the at least two pairs of conveying rollers and is deflected a second time while being conveyed by two of the at least two pairs of conveying rollers; wherein the first deflection is effected by

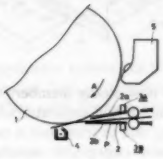
operating the paper feeding means for a period of time when one of the at least two pair of conveying rollers is stopped and the second deflection is effected by operating one of the at least two pair of conveying rollers for a period of time when another of the at least two pair of conveying rollers is stopped.

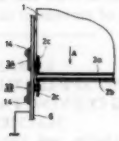
4,708,457

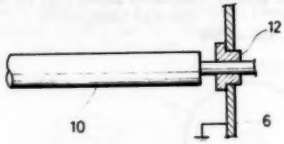
SEMI-CONDUCTOR MOUNTING MEMBERS FOR SHEET-FEEDING GUIDE PLATES AND ROLLERS

Shoichi Shimura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 13, 1986, Ser. No. 929,821
Claims priority, application Japan, Dec. 11, 1985, 60-278486
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—3 TR **7 Claims**







1. An image forming system comprising:
an image carrier for carrying a toner image to be transferred to a flexible, sheet-like transfer medium;
transfer means for transferring said toner image to said transfer medium by exposing the same to an electric charge;
guide means arranged to guide said transfer medium to said toner image carried by said image carrier; and
a semi-conductive support member arranged to support said guide means on a grounded system body, so as to permit electric charge to travel between said guide means and said system body.

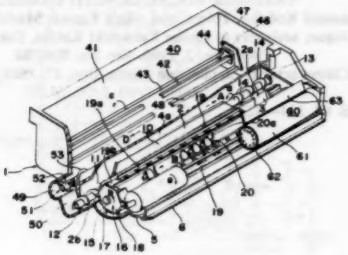
4,708,458

ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS

Masahide Ueda, and Tadashi Ohira, both of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 25, 1986, Ser. No. 843,586
Claims priority, application Japan, Apr. 3, 1985, 60-71754
Int. Cl.[4] G03G *15/08*
U.S. Cl. 355—3 DD **9 Claims**

1. An electrostatic latent image developing apparatus for use in a copying machine or the like, which comprises:
a transport and supply means for circulating and transporting a developer mix filled in the developing apparatus, while mixing and stirring the developer mix, towards a developing means for developing an electrostatic latent image formed on an electrostatic latent image carrier surface;
a toner replenishing means for replenishing the transport and supply means with a new toner material;
a toner concentration detecting means for detecting a toner concentration of the developer mix within the developing apparatus;
a drive control means for the setting of a toner concentration reference value which is operable to at least stir the developer mix within the developing apparatus separately from normal developing operations;
a memory means for storing a reference value detected by the toner concentration detecting means at the time of driving toner concentration reference value setting; and
a toner replenishment control means for comparing a detection value of the toner concentration detecting means with the toner concentration reference value during the normal developing operation and for actuating the toner replenishing means.

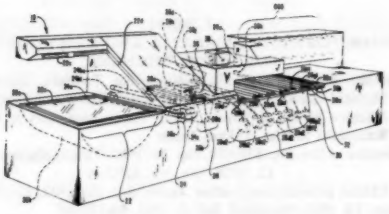


4,708,459

ELECTROPHOTOGRAPHIC COLOR PROOFING APPARATUS AND METHOD

Carl E. Cowan, Rochester; Anthony R. Lubinsky, Webster; Thomas W. Nylund, Rochester; Malcolm R. Specht, Rochester, and John P. Spence, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 11, 1986, Ser. No. 838,637
Int. Cl.[4] G03G *15/01, 13/01*
U.S. Cl. 355—4 **65 Claims**



19. Electrophotographic apparatus for generating a proof from a set of half-tone color separations comprising:
platen means for receiving a photoconductive record member;
means for receiving on said platen a half-tone color separation which is placed between the platen and a photoconductive record member;
charging means including a control grid for applying a controlled charge potential on a photoconductive record member;
means for controlling the exposure of a photoconductive

layer of a photoconductive record member through a separation to a suitable source of radiant energy to form a latent electrostatic image of a pattern carried by said separation;

a plurality of development electrodes for developing said resulting latent electrostatic image with a selected one of a plurality of color toners;

means for controlling the voltage on said selected development electrode during a toning operation; and

means for controlling the dot size of an image formed on a photoconductive record member by cooperatively varying the exposure, the grid potential on said charger and the potential on said selected development electrode.

4,708,460

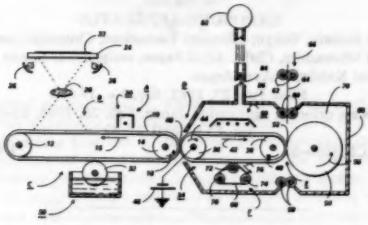
SIMULTANEOUS TRANSFER AND FUSING IN ELECTROPHOTOGRAPHY

Michael J. Langdon, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jul. 25, 1986, Ser. No. 889,457

Int. Cl.[4] G03G *15/10*

U.S. Cl. 355—10 **24 Claims**



1. An apparatus for forming a copy of an original document, including:

a member having a liquid image of liquid carrier with toner particles dispersed therein deposited thereon;

an intermediate member positioned to have a portion thereof closely adjacent said member;

means for attracting the liquid image from said member to said intermediate member; and

means for transferring at least the toner particles from said intermediate member to a copy sheet and fusing simultaneously the toner particles to the copy sheet in image configuration to form the copy of the original document.

4,708,461

COPYING MACHINE WITH A RESERVATION FUNCTION

Masakiyo Okuda, Kashiwara, and Kazuyuki Ohnishi, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 26, 1985, Ser. No. 813,537

Claims priority, application Japan, Dec. 27, 1984, 59-276564; Dec. 27, 1984, 59-276575

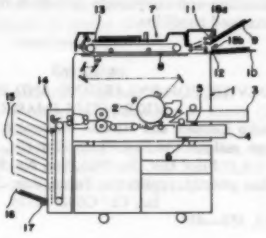
Int. Cl.[4] G03G *21/00, 15/22*

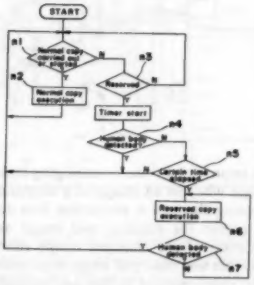
U.S. Cl. 355—14 R **6 Claims**

1. A copying machine with a reserve function for automatically copying reserved originals set on original trays, comprising:

a judging means for judging whether or not the copying machine is in a condition for copying originals other than reserved originals during the reserved copying operation and;

means for copying originals prior to the copying of reserved originals when said judging means judges that originals other than reserved originals should be copied, wherein said judging means judges that said copying machine is in a condition in which it can be used for copying originals other than reserved originals when a predetermined time





period has elapsed subsequent to copying a reserved original.

4,708,462

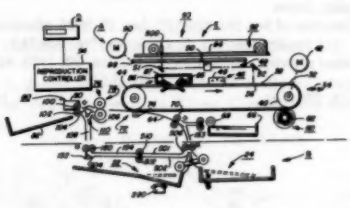
AUTO DUPLEX REPRODUCTION MACHINE

Denis J. Stemmle, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 814,827, Dec. 30, 1985, Pat. No. 4,660,963. This application Oct. 30, 1986, Ser. No. 925,351

Int. Cl.[4] G03G *15/00*; G03B *27/32, 27/52*

U.S. Cl. 355—24 **15 Claims**



1. A method of copying original documents onto both sides of copysheets to produce duplex copysheets including the steps of:

determining the number of copies to be made from an original document;

copying images from said document onto the first sides of copysheets at said copying station;

passing copysheets bearing an image on said first side thereof to a duplex paper path to return said sheets to said copying station, said duplex paper path having at least two selectable copysheet paths including a first copysheet path returning said copysheets directly to said copying station, and said second copysheet path passing said copysheets to

a duplex buffer tray for storage prior to returning said copysheets to said copying station; and

selecting one of said first and second copysheet paths and directing said copysheets thereto in response to a predetermined condition.

4,708,463

DEVICE FOR ENLARGING AND PROJECTING MICROFILM IMAGE

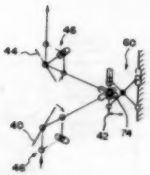
Masahiko Kondoh, and Hiroshi Matsuoka, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Dec. 30, 1986, Ser. No. 947,694

Claims priority, application Japan, Jan. 21, 1986, 61-10784

Int. Cl.[4] G03B *13/28*

U.S. Cl. 355—45 **8 Claims**



1. An improved device for enlarging and projecting a microfilm image wherein an image of a microfilm is delivered by a light passing through a projection lens and then through an optical system for rotating said image and for varying the magnification of the enlarged image relative to the original image so that said enlarged image is projected onto a screen or a printer, characterized in that said optical system comprises:

a set of reflectors, said set of reflectors including three or more odd numbers of reflectors;

magnification varying means for changing the length of the light path; and

image rotation means for rotating said set of reflectors about the incident-and-projection axis.

4,708,464

DEVICE FOR ERASING UNNECESSARY IMAGES FOR USE IN READER-PRINTERS

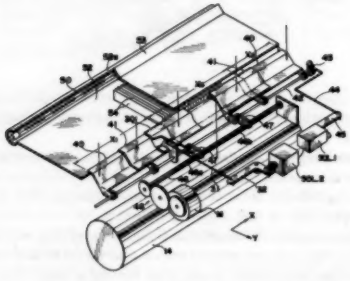
Hajime Otsuki, Yokohama; Kenjiro Ishii, Sagamihara; Yutaka Satoh, Yokohama, and Fumio Fukumoto, Sagamihara, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 823,527, Jan. 29, 1986, abandoned. This application Nov. 7, 1986, Ser. No. 928,712

Claims priority, application Japan, Jan. 30, 1985, 60-17247

Int. Cl.[4] G03B *13/28*

U.S. Cl. 355—45 **10 Claims**



1. A device for erasing unnecessary images for use in reader-printers in which an image of a microfilm is selectively projected to a screen entirely or to a photosensitive medium through a slit stepwisely and the image projected to the photosensitive medium is formed into a positive copy irrespective of negative or positive film, said device comprising;

first flap means disposed in the vicinity of at least one longitudinal end of the slit and movable into or out of an optical path for the image directed to the photosensitive medium for partially blocking the image when positioned in the optical path, said first flap means forming a block region which has a variable area when positioned in the optical path and having a reflecting surface on one side thereof opposed to the photosensitive medium,

second flap means disposed in the vicinity of the slit and movable into or out of the optical path for blocking the image in its entirety in cooperation with said first flap means when positioned in the optical path, said second flap means having a reflecting surface on one side thereof opposed to the photosensitive medium,

illuminating means for projecting light onto the first and second flap means, and

means for controlling the movement of said first and second flap means and the operation of said illuminating means.

4,708,465

EXPOSURE APPARATUS

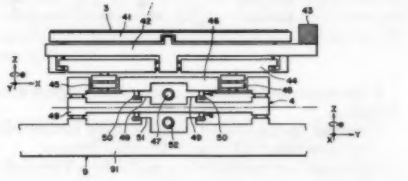
Junji Isohata, Tokyo; Hironori Yamamoto, Chigasaki, and Koichi Matsushita, Chiba, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 27, 1987, Ser. No. 19,663

Claims priority, application Japan, Feb. 28, 1986, 61-41428

Int. Cl.[4] G03B *27/42*

U.S. Cl. 355—53 **4 Claims**



1. A position detecting device usable in an exposure apparatus for transferring an image of a first object onto a second object, for detecting the position of at least one of the first and second objects, said device comprising:

a rotatable portion having a carrying portion for carrying thereon said at least one object;

first supporting means for supporting said rotatable portion, said first supporting means including first drivng means for moving said rotatable portion in a rotational direction;

second supporting means for supporting said first supporting means, said second supporting means including second driving means for moving said first supporting means in a rotational direction; and

displacement detecting means for detecting displacement of said first supporting means.

4,708,466

EXPOSURE APPARATUS

Junji Isohata, Tokyo, and Makoto Miyazaki, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 3, 1987, Ser. No. 10,481

Claims priority, application Japan, Feb. 7, 1986, 61-024066; Feb. 7, 1986, 61-024067

Int. Cl.[4] G03B *27/42*

U.S. Cl. 355—53 **10 Claims**

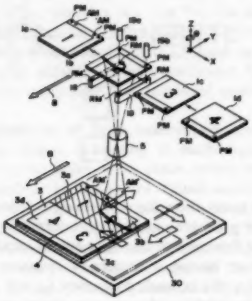
1. An exposure apparatus for photolithographically transferring patterns of different originals onto different portions of a workpiece, said apparatus comprising:

means for exposing, in sequence, the portions of the workpiece to the patterns of the corresponding originals with radiation;

means for positioning one of the originals having the pattern that is just going to be transferred onto one of the portions of the workpiece;

first detecting means for detecting a positional relation between an alignment mark provided on one of the originals and an alignment mark formed on the workpiece;

second detecting means for detecting the position of the workpiece; and



control means operable, when a first one of the portions of the workpiece is to be exposed to the pattern of a corresponding first one of the originals, to position the first portion of the workpiece relative to the first original, having been positioned by said positioning means, in accordance with the detection by said first detecting means, said control means being operable, when a second one of the portions of the workpiece is to be exposed to the pattern of a corresponding second one of the originals, to position the second portion of the workpiece relative to the second original, having been positioned by said positioning means, in accordance with the detection by said second detecting means.

4,708,467

CAMERA

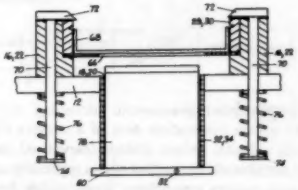
Siegfried K. Raith, North Lake, Australia, assignor to Cameronics Technology Corporation, Ltd., Bayswater, Australia

Division of Ser. No. 777,925, Sep. 19, 1985, abandoned. This application Dec. 12, 1986, Ser. No. 942,014

Claims priority, application Australia, Sep. 21, 1984, PG7246

Int. Cl.[4] G03B *27/42*

U.S. Cl. 355—53 **7 Claims**



1. A camera for providing microfiche images, comprising a piston located in a pneumatic cylinder and arranged for reciprocable motion between a first retracted position and a second extended position, a first end of the cylinder being closed off by an end plate, a second end of the cylinder being open, a compressed gas inlet adjacent the second end of the cylinder such that the piston can be caused to move towards its second position upon compressed gas being fed through the compressed gas inlet, a cassette holder arranged to be located adjacent the pneumatic cylinder, a base in the cassette holder, an aperture in the base so that when the piston is in it second extended position a film sheet cassette may be raised from the cassette holder to enable a film sheet to be removed from or placed into the cassette by means of a vacuum platen.

4,708,468

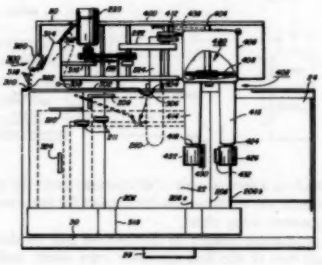
SELF ADJUSTING PAPER GUIDE

Denis J. Stemmle, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 814,827, Dec. 30, 1985, Pat. No. 4,660,963. This application Oct. 30, 1986, Ser. No. 925,865

Int. Cl.[4] B65H *1/00*; G03B *27/58*

U.S. Cl. 355—72 **3 Claims**



1. A reproduction machine for copying documents and including a paper tray for storing paper and accommodating a predetermined number of paper sheet sizes, comprising:

a tray member, having a generally planar paper sheet receiving surface, and fixed abutment members on a first side edge of said surface, and a front edge, in the direction of paper sheet travel out from said tray member, and extending upwardly from said paper sheet receiving surface;

at least one disappearing paper guide member mounted for reciprocating movement through a slot in the paper sheet receiving surface and spaced a distance from said abutment member corresponding to the width of a selected paper sheet size, whereby said disappearing paper guide is biased to a position below said paper sheet receiving surface by a paper sheet received in said tray member and having a width larger than said selected paper sheet size.

4,708,469

INTERACTIVE SYSTEM FOR SIGNATURE PRODUCTION

Henry T. Bober, Fairport, and Michael S. Doery, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 18, 1986, Ser. No. 897,570

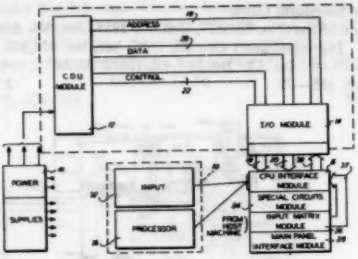
Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—77 **7 Claims**

1. In a copier having a control (user interface) and a plurality of operating components cooperating with one another to produce impressions on copy sheets, the operating components including a photoreceptor, a platen for supporting first side by side documents to be imaged, an optical system for projecting images of the documents onto the photoreceptor, a developer for developing images of the side-by-side documents on one side of a copy sheet, the side one copy sheet later receiving images of second side-by-side documents on the platen, the control including a console for displaying operator messages and for entering program data, the method for providing completed signature sets for center folding such sets for assembly into booklet form comprising the steps of:

(a) entering into the console the number of pages to appear in the completed signature sets,

(b) determining a check value for document orientation to provide signatures,
(c) displaying the orientation of documents in signatures for the correct placement of documents on the platen,
(d) loading a first pair of documents onto the platen in the orientation as shown on the display for side one of the first signature copy sheet,
(e) producing images of the first pair of documents on side one of the first signature copy sheet,



(f) loading a second pair of documents onto the platen in the orientation as shown on the display for side two of the first signature copy sheet,
(g) producing images of the second pair of documents on side two of the first signature copy sheet, and
(h) repeating steps d, e, f and g until all signatures are produced in the proper orientation for assembly into a booklet form.

4,708,470

OPERATION PANEL AND A DISPLAYING METHOD FOR A COPYING MACHINE

Shinobu Satonaka, Toyonaka; Masanobu Takahashi, Suita; Takahiro Wakikaido, Yao, and Masahiro Yoshioka, Matsubara, all of Japan, assignors to Mita Industrial Co., Ltd., Japan

Filed Sep. 24, 1985, Ser. No. 779,558
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—77 **7 Claims**

1. In a copying machine having an operating panel with a plurality of displays thereon, the displaying method comprising identifying certain data as set data, setting the copy image density by automatic exposure, clearing the set data at least during the setting of the copy image density, and displaying the set data after the setting of the copy image density is completed.

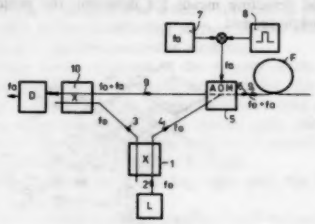
4,708,471

OPTICAL TIME-DOMAIN REFLECTOMETER USING HETERODYNE RECEPTION

Friedrich-Karl Beckmann, Pinneberg; Wolfgang Hoppe, Norderstedt, and Reinhard Knöchel, Elmshorn, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 21, 1986, Ser. No. 832,289
Claims priority, application Fed. Rep. of Germany, Feb. 27, 1985, 3506884
Int. Cl.[4] G01N *21/84, 21/88*
U.S. Cl. 336—73.1 **10 Claims**

1. An optical time-domain reflectometer comprising:
a light source for producing a light beam of frequency f_o;
a beam splitter for dividing the light beam into a local oscillator beam and a measuring beam;
an acousto-optical modulator arranged to receive the measuring beam, to direct the measuring beam into an optical fiber to be measured, and to receive a portion of the measuring beam which is backscattered from the fiber, said acousto-optical modulator being capable of directing the backscattered beam away from the beam splitter when the acousto-optical modulator is in a first state, said acousto-optical modulator being capable of shifting the frequency of the measuring beam by an acoustic frequency f_a when the acousto-optical modulator is in a second state different from the first state;
a receiver arranged to receive the local oscillator beam from the beam splitter and arranged to receive the backscattered beam from the acousto-optical modulator, said receiver producing an electrical output signal in proportion to the intensity of the light beams incident thereon, said receiver having a frequency response greater than or equal to the acoustic frequency f_a; and
means for exciting the acousto-optical modulator into the second state for a short duration to direct a measuring beam pulse of frequency f_o+f_a into the optical fiber.

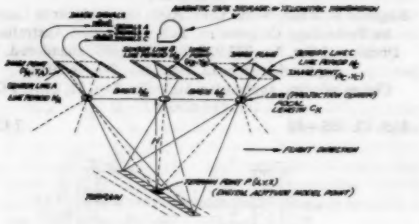


4,708,472

STEREOPHOTOGRAMMETRIC SURVEYING AND EVALUATION METHOD

Otto Hofmann, Kirchstockach, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH, Fed. Rep. of Germany

Filed May 13, 1983, Ser. No. 494,772
Claims priority, application Fed. Rep. of Germany, May 19, 1982, 3219032
Int. Cl.[4] G01C *7/02*
U.S. Cl. 356—2 **2 Claims**



1. In a stereophotogrammetric surveying and evaluation method to obtain orientation data of a camera flying over a terrain, and a digital terrain altitude (elevation) model, which camera is not attitude controlled and is especially carried by an aircraft, said camera comprising three sensor lines A, B, C, arranged transversely or obliquely to the flight direction in the image plane of the camera for continuous line by line scanning of the terrain flown over, and generation of overlapping line image strips A_S, B_S, C_S, taken always from a different perspective, the line images each consisting of a plurality of adjacent image points, the improvement comprising that
(a) all three line sensors are always used and thereby three overlapping line image strips A_S, B_S, C_S are generated,
(b) the line image generation of the sensor lines A, B, C is

synchronized and the consecutive numbers N of the line images are registered,

(c) in one of the line image strips image points, arranged mesh-like and corresponding to the points of the digital terrain altitude (elevation) model are selected and the corresponding (homologous) image points and their image coordinates x, y and the associated line image numbers N_A, N_B, N_C are determined by means of area correlation in the two other image strips,

(d) due to the approximately known flight movements for each digital altitude (elevation) model point with its associated line image numbers N_A, N_B, N_C, the approximate orientation parameters of said camera and from that and with the image point coordinates x_A, y_A and x_B, y_B and x_C, y_C, the digital altitude model coordinates X, Y Z are approximately determined by means of spatial intersection,

(e) the establishment of beam intersection conditions for image point beams, belonging to each digital altitude (elevation) model point, takes place, which image point beams are defined by the digital altitude model point, the positions of the perspective center of said camera corresponding to the line image numbers N_A, N_B, N_C, and the image points, located on the sensor lines A, B, C, with the respective x and y coordinates, wherein the orientation parameters are represented as functions of update points which are arranged in certain intervals along the flight path, that error equations are established according to indirect observations, and that the most probable and final values of the orientation parameters in the update points and the digital altitude (elevation) model coordinates are determined by means of a least-squares adjustment process.

4,708,473

ACQUISITION OF RANGE IMAGES

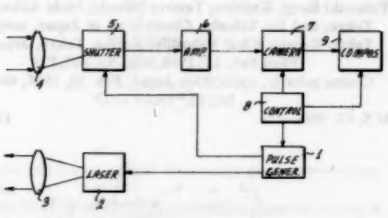
Walter Metzdorff, Friedrichshafen; Peter Lux, Langenargen, and Max Eibert, Friedrichshafen, all of Fed. Rep. of Germany, assignors to Dornier GmbH, Friedrichshafen, Fed. Rep. of Germany

Filed Feb. 1, 1985, Ser. No. 697,263

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1984, 3404396

Int. Cl.[4] G01C *3/08*; G01B *11/24*

U.S. Cl. 356—5 **3 Claims**



1. Method for generating range images comprising the steps of, generating a plurality of partial range images by means of transmitting short light pulses and receiving reflections arriving within particular periods of time only, including, producing each of said partial images with a different gray value; and

composing a composite range image from said partial images by combining different gray values of the different partial images.

4,708,474

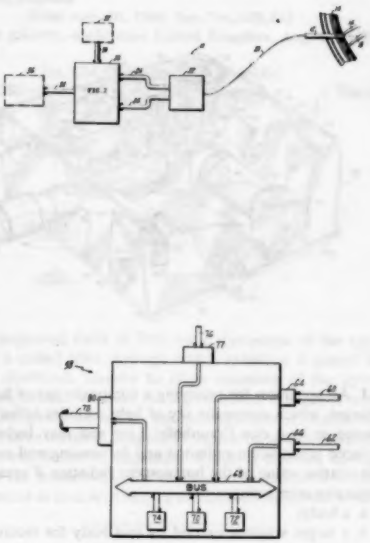
REFLECTION CORRECTED RADIOSITY OPTICAL PYROMETER

Ernesto Suarez-Gonzalez, Tequesta, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 14, 1985, Ser. No. 798,212

Int. Cl.[4] G01J *5/60*

U.S. Cl. 356—45 **2 Claims**



1. A pyrometer for measuring the true temperature of a remote target, comprising:

optical guide means, for receiving a target optical beam having a spectral width, and including an emitted energy component and a reflected energy component from sources in proximity to the target, each energy component having an equivalent black body temperature;

detector module means, for dividing said target optical beam into a filtered optical signal, having a spectral width less than said target optical beam, and an unfiltered optical signal, and for providing electrical signal equivalents thereof;

signal processing means, having a memory means for storing signals, including signals indicative of a plurality of target temperature value signals, each corresponding to an associated one of a plurality of reflection corrected energy (E) signal magnitudes, and including energy ratio signals indicative of the ratio of the unfiltered optical signal magnitude to the filtered signal magnitude, said processing means

calculating a reflection corrected energy signal as the difference signal magnitude between said electrical signal equivalents of said filtered optical signal and the product of said energy ratio signal and said unfiltered optical signal, and

identifying for each said calculated reflection corrected energy signal with a corresponding one of said plurality of target temperature value signals, and providing output signals indicative thereof.

4,708,475

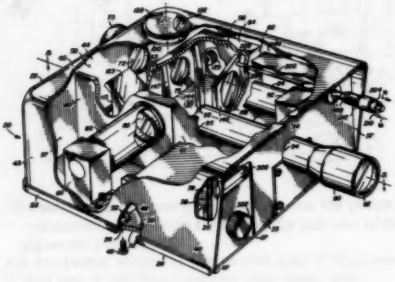
PORTABLE LUMINESCENCE SENSOR

Robert D. Watson, Brigham City, Utah, assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation of Ser. No. 706,739, Feb. 28, 1985, abandoned, which is a continuation-in-part of Ser. No. 509,681, Jun. 30, 1983, abandoned. This application May 31, 1985, Ser. No. 739,713

Int. Cl.[4] G01N *21/64*

U.S. Cl. 356—417 **15 Claims**



1. An apparatus for receiving a composite ray of light from a target, which composite ray of light includes reflected light having at least one Fraunhofer Line and may include solar induced luminescent radiation and for sensing and measuring the relative value of the luminescent radiation if present, said apparatus comprising:

a. a body;

b. a target window carried by said body for receiving said composite ray of light therethrough along a first optical path;

c. a first optical filter aligned along said first optical path for:

i. transmitting therethrough a first fraction of said composite ray of light along said first optical path, said first fraction of said composite ray of light being limited to a first selected waveband containing a selected Fraunhofer Line, and

ii. redirecting the remainder of said composite ray of light along a second optical path;

d. a second optical filter aligned along said first optical path for limiting the light energy content of light passing therethrough to a second selected waveband which is narrower than said first selected waveband and including, but wider than, said selected Fraunhofer Line;

e. tuning means for effecting selective angular adjustment of said second optical filter relative said first optical path;

f. first sensor means aligned along said first optical path for receiving light in said second selected waveband and for sensing the electro-magnetic energy level contained therein;

g. a third optical filter aligned along said second optical path for transmitting a narrowed waveband in the continuum offset from said selected Fraunhofer Line by a selected frequency difference;

h. second sensor means aligned along said second optical path for receiving said light in said narrowed waveband in the continuum and for sensing the electromagnetic energy level contained therein; and

i. indicator means for providing a sensible readout of the energy level sensed by said first and said second sensor means.

4,708,476

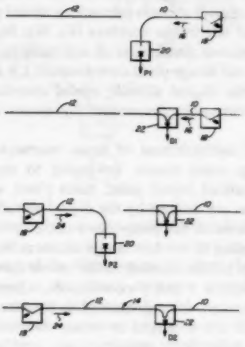
METHOD OF DETERMINING OPTICAL FIBER SPLICE LOSS

Vincent C. So; Richard P. Hughes; Paul J. Vella, and Jason B. Lamont, all of Edmonton, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Apr. 29, 1986, Ser. No. 857,223

Int. Cl.[4] G01N *21/84, 21/59*

U.S. Cl. 356—73.1 **7 Claims**



1. In the formation of a splice between first and second optical fibers each including an end to be spliced, a method of determining loss at the splice comprising the steps of:

(1) supplying a first optical signal to the first fiber in a direction towards said end thereof and determining an optical signal level at said end;

(2) supplying a second optical signal to the second fiber in a direction towards said end thereof and determining an optical signal level at said end;

(3) determining, with a symmetric detector which is substantially equally responsive to optical signals in each direction, an optical signal level in the first fiber due to the first optical signal supplied thereto;

(4) after formation of a splice between said fibers at said ends thereof, determining with said symmetric detector an optical signal level in the first fiber due to the second optical signal supplied to the second fiber; and

(5) determining the loss at the splice from the determined optical signal levels.

4,708,477

PHOTOMETER

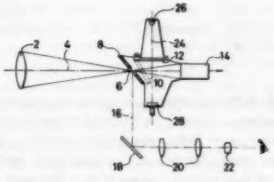
Yabusaki Kenji, Kashiwa; Tozawa Hitoshi; Noda Akira, both of Tokyo, and Ito Takashi, Ohmiya, all of Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 13, 1986, Ser. No. 829,273

Claims priority, application Japan, Feb. 19, 1985, 60-30814

Int. Cl.[4] G01J *1/42*

U.S. Cl. 356—222 **12 Claims**



1. A photometer comprising:

a first light receiving portion;

a second light receiving portion less sensitive to changes in temperature and other environmental influences than said first light receiving portion;

an optical portion including a reference light source and adapted for introducing light from a subject into said first light receiving portion and for introducing light from said reference light source into said first and second light receiving portions on the basis of a control signal from a controller position;

said controller position for feeding a first control signal by which said light from said subject is introduced into said first light receiving portion in accordance with a comman from an observer, and a second control signal by which said light from said reference light source is introduced into said first and second light receiving portions;

a memory portion for memorizing a photometric quantity Pr from a standard light source for setting the scale, an output Dr of said first light receiving portion generated by said light from said standard light source, an output Dpo of said first light receiving portion generated by said light from said reference light source during the scale setting time, and an output Dso of said second light receiving portion generated by said light from said reference light source during the scale setting time;

an operation portion supplied with an output Dm of said first light receiving portion generated by said light from said subject, an output Dpt of said first light receiving portion generated by said light from said reference light source during the measuring time, an output Dst of said second light receiving portion generated by said light from said reference light source during the measuring time, and said outputs Dr, Dpo and Dso read from said memory portion,

said operation portion calculating a value Pm of measured quantity of light said subject of the operation:

$$Pm = Pr \times \frac{Dpo \cdot Dst}{Dpt \cdot Dso} \times \frac{Dm}{Dr}$$

4,708,478

TUBE CELL FOR ATOMIC ABSORPTION SPECTROPHOTOMETRY

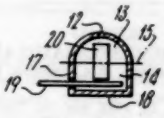
Arthur S. Andrews, Royston, and David S. Widmer, Cambridge, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 634,922, Jul. 26, 1984, abandoned. This application Nov. 3, 1986, Ser. No. 926,822

Claims priority, application United Kingdom, Aug. 3, 1983, 8320949

Int. Cl.[4] G01N *21/74*

U.S. Cl. 356—244 **28 Claims**



1. A tube cell for an atomic absorption spectrophotometer comprising

a tubular body of electrically conductive material having a length with a longitudinal axis extending substantially horizontal,

said tubular body having a cross-section in a plane transverse to said longitudinal axis, said transverse cross-section being at least a minimum at the center of said length of said tubular body, and

said tubular body having a cross-sectional area for said transverse cross-section above a horizontal line midway between a top and a bottom of said tubular body, said cross-sectional area above said horizontal line being smaller than the cross-sectional area for said transverse cross-section of said tubular body below said horizontal line.

4,708,479

FIBRE OPTIC GYROSCOPE WITH TEMPERATURE COMPENSATION

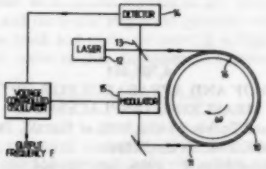
Malcolm S. Dye, Stevenage, and Arthur J. Barlow, Southampton, both of England, assignors to British Aerospace PLC, London, England

Filed Aug. 10, 1984, Ser. No. 639,432

Claims priority, application United Kingdom, Aug. 13, 1983, 8321870

Int. Cl.[4] G01B *9/02*; G01C *19/64*

U.S. Cl. 356—350 **4 Claims**



1. An improved form of fibre optic gyroscope of the type includng a coiled fibre through which radiation is passed in opposed directions, thereby to allow rotations of the gyroscope to be sensed, wherein the improvement comprises temperature compensation means, comprising a former element on which the fibre is coiled, adapted to impose on said coiled fibre a thermal coefficient of expansion which is selected having regard to the refractive index temperature coefficient of the coiled fibre so as to at least reduce the difference therebetween.

4,708,480

SOLID-STATE OPTICAL INTERFEROMETER

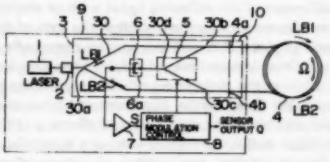
Takao Sasayama; Shigeru Oho; Atsushi Kanke; Takanori Shibata, all of Hitachi, and Akira Endo, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 16, 1984, Ser. No. 661,454

Claims priority, application Japan, Oct. 17, 1983, 58-192494

Int. Cl.[4] G01C *19/64*

U.S. Cl. 356—350 **10 Claims**



1. A solid-state optical interferometer comprising:

a loop-shaped optical fiber having end portions;

a solid-state light wave guide optically coupled to said optical fiber, said solid-state light wave guide forming a light path in conjunction with said optical fiber for enabling mixing of light received from the end portions of said optical fiber;

electrodes for producing a surface acoustic wave (SAW), said surface acoustic wave being used to apply optical modulation to a light beam passing through said solid-state light wave guide, said electrodes being formed as a pair on

a surface of a substrate on which said solid-state light wave guide is formed;

said solid-state light wave guide formed on said substrate including two pieces of input light wave guides arranged on said substrate so as to form a predetermined angle therebetween, and at least one piece of output light wave guide coupled to said two pieces of input light wave guides, light beams fed from said two pieces of input light wave guides being recombined into an interference beam by said surface acoustic wave (SAW), said interference beam being sent out through said at least one piece of output light wave guide;

a detector circuit for detecting a direction change of a car by utilizing said interference beam; and

a circuit for correcting a change generated in the output of said detector circuit while the car is not running.

4,708,481

METHOD OF AND APPARATUS FOR OPTICALLY MEASURING DISPLACEMENT

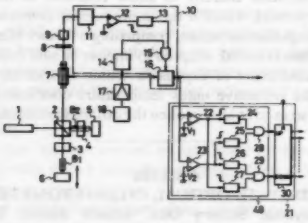
Sadao Mori, and Toshio Akatsu, both of Ibaraki, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 27, 1986, Ser. No. 844,682

Claims priority, application Japan, Mar. 27, 1985, 60-60580

Int. Cl.[4] G01B *9/02*

U.S. Cl. 356—358 **21 Claims**



1. In a method wherein light beams are projected on a reference plane and an object to-be-measured, and a displacement of the object to-be-measured is measured by utilizing interference of reflected lights from the reference plane and the object to-be-measured; a method of optically measuring a displacement comprising the step of cyclically and forcibly changing a phase difference of the reflected lights with an amplitude of at least π rad by means of a phase shifter, the step of detecting a magnitude of phase shift at a moment by means of a sampling circuit and from a magnitude of a drive signal applied to said phase shifter at the moment at which phasic changes of the reflected lights based on the displacement of the object to-be-measured are compensated to a phase difference of fixed value by said phase shifter, the step of storing a magnitude of phase shift for compensating a phase difference of the reflected lights exhibited when the object to-be-measured lies at a position of an origin, by means of an origin position storing circuit, the step of counting a discontinuous change of the magnitude of phase shift arising each time the phase difference of the reflected lights exceeds a fixed value, by means of a counter circuit, and the step of optically finding a displacement magnitude of the object to-be-measured from the content of said origin position storing circuit, a content of said counter circuit, and an output of said sampling circuit expressive of a magnitude of phase shift for compensating a phase difference of the reflected lights exhibited when the object to-be-measured lies at a final position.

4,708,482

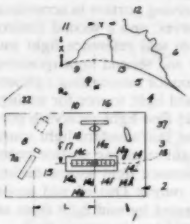
METHOD AND APPARATUS FOR MEASURING WEAR IN THE LINING OF REFRACTORY FURNACES

Gary L. Neiheisel, Cincinnati, Ohio, assignor to Armco Inc., Middletown, Ohio

Continuation-in-part of Ser. No. 351,316, Feb. 22, 1982, abandoned. This application Dec. 13, 1983, Ser. No. 560,915

Int. Cl.[4] G01B *11/02*; F27D *1/16*

U.S. Cl. 356—376 **13 Claims**



1. Apparatus for mesuring the relative thickness of the hot interior wall of a furnace vessel and the like comprising inspection means including:

a laser transmitter for directing a collimated substantially monochromatic laser light beam toward the interior surface wall;

a self-scanned linear array receiver positioned to detect the laser light beam scattered from the furnace wall, said array comprising a plurality of optical elements positioned in side-by-side relationship, each of said elements producing an electrical signal in response to the scattered laser beam, and means responsive to a scanning signal for sequentially scanning said elements at a predetermined rate to produce a video output signal;

a bandpass optical filter positioned in the path of the laser beam scattered from the furnace wall for passing to the linear array only those wavelengths associated with the scattered laser beam and rejecting those wavelengths associated with background radiation emitted by the hot furnace wall;

means for automatically compensating for changes in background radiation comprising means for sensing the level of background radiation detected by said array and means responsive to said sensed level for adjusting the scanning rate of said elements so as to reduce the effect of background radiation in said video signal;

means for correlating said video signal with the relative wall thickness at a particular point on the furnace wall; and

means for displaying the measured relative wall thickness.

4,708,483

OPTICAL MEASURING APPARATUS AND METHOD

Robert D. Lorenz, Madison, Wis., assignor to Rexnord Inc., Brookfield, Wis.

Filed Jun. 28, 1985, Ser. No. 750,348

Int. Cl.[4] G01B *11/14*

U.S. Cl. 356—376 **45 Claims**

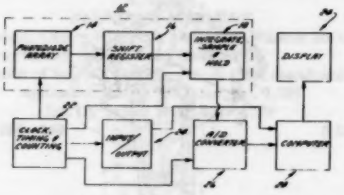
1. In an optical triangulation probe apparatus for measuring the distance of a surface utilizing light reflected from the surface and including a light source projecting a beam of light toward the surface, the combination comprising:

an actual light spot image having a predetermined known image intensity distribution shape and formed from the light reflected from the surface;

detector means for receiving the actual light spot image and producing a plurality of signals representative of the image intensity distribution of the actual light spot image shape and the location of the image on the detector means, the position of the actual light spot on the detector means

having a known relationship to the distance of the surface; and

estimating means containing a signal representation of a theoretical reference light spot image intensity shape and the spatial location of the theoretical reference light spot image for receiving the plurality of signals representative of the intensity distribution of the actual light spot image



shape and estimating the spatial location of said plurality of signals representative of the intensity distribution of the actual light spot image coinciding with the signal representation of the theoretical reference light spot image shape whereby the surface distance is measured due to the known relationship between the position of the actual light spot image and the distance of the surface.

4,708,484

PROJECTION ALIGNMENT METHOD AND APPARATUS

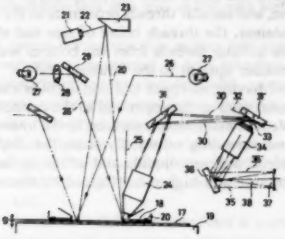
Yoshihiro Komeyama; Yukio Kembo, both of Yokohama; Asahiro Kuni, Tokyo; Ryuuichi Funatsu, Yokohama; Akira Inagaki, Yokohama; Minoru Ikeda, Yokohama, and Keiichi Okamoto, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 21, 1985, Ser. No. 789,778

Claims priority, application Japan, Oct. 24, 1984, 59-222009; Feb. 22, 1985, 60-32874; Apr. 12, 1985, 60-76384

Int. Cl.[4] G01B *11/26*

U.S. Cl. 356—401 **7 Claims**



1. An alignment method comprising the steps of:

providing a mask having a plurality of symmetrical formations of alignment patterns including linear segments formed in a peripheral portion of the mask, and a wafer having a plurality of symmetrical formations of alignment patterns including linear segments extending in a direction of the alignment patterns of the mask;

illuminating both the mask alignment patterns and the wafer alignment patterns through an area of the mask alignment patterns along a direction inclined to an alignment direction plane utilizing each of a plurality of illumination optical systems arranged so as to not interefere with an exposure light beam, the illumination optical systems having an illumination optical axis inclined with respect to the alignment direction plane extending perpendicularly with respect to a symmetrical center line direction of the alignment patterns;

focusing reflected images from both the mask alignment patterns and the peripheral alignment patterns on a detector surface of a respective image detector of each of a plurality of alignment pattern magnifying optical systems including an object lens and arranged so as to not interfere with an exposure light beam, the alignment pattern magnifying optical systems having a detection optical axis inclined with respect to the alignment direction plane and the object lenses having a small NA (Numerical Aperture);

transforming each of the focused reflected images into image signals;

converting each of the image signals into digital signals utilizing A/D conversion and storing the digital signals in a memory;

reading out the digital signals from the memory for determining the center of the mask alignment patterns and the wafer alignment patterns;

detecting a relative displacement between the mask and wafer from each of the centers of the mask alignment patterns and the wafer alignment patterns; and

aligning the mask and wafer by moving at least one of the mask and wafer so that displacement therebetween does not exist.

4,708,485

APPARATUS FOR MONITORING A STREAM OF COMMINUTED SOLID MATERIAL

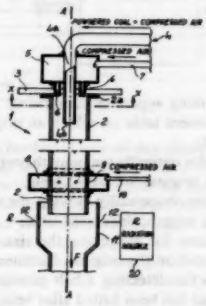
Ernesto Illy, Trieste, Italy, assignor to Illycaffè S.p.A., Trieste, Italy

Filed Dec. 3, 1984, Ser. No. 677,158

Claims priority, application Italy, Dec. 1, 1983, 23712/83[U]

Int. Cl.[4] G01N *21/01, 21/17*

U.S. Cl. 356—440 **11 Claims**



1. Apparatus for monitoring a stream of comminuted solid material comprising an elongated first vessel having longitudinally spaced first and second ends, said second end being open; a pneumatic conveyor including a conduit arranged to deliver a stream of comminuted material, said conduit having an end portion which extends into the interior of said vessel through said first end and is provided with a discharge end between said first and second ends, and said end portion and said vessel cooperating to define a space in the region between said first and discharge ends; means for propelling the admitted material longitudinally of and toward the second end of said vessel, including means for discharging at least one first current of compressed gaseous fluid into said space in longitudinal direction of said vessel; means for admitting at least one second current of compressed gaseous fluid into said vessel substantially radially inwardly and at a location between said discharge end and said second end to form a mixture of comminuted material and gaseous fluid; a discrete second vessel arranged to receive the mixture of comminuted material and gaseous fluid by way of said open second end; and a source of radiation arranged to direct at least one beam of radiation

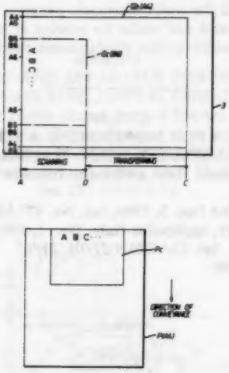
across said second vessel and transversely of the flow of the mixture of gaseous fluid and comminutes material in said second vessel.

4,708,486

IMAGE-FORMING APPARATUS

Junji Watanabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 9, 1986, Ser. No. 861,346
Claims priority, application Japan, May 20, 1985, 60-107707; May 20, 1985, 60-107709
Int. Cl.[4] H04N 1/21, 1/04; G03G 15/28
U.S. Cl. 358—296 20 Claims



1. An image-forming apparatus comprising:

an original document table on which an original document can be placed;

scanning means for optically scanning the original document placed on the original document table;

moving means for reciprocally moving the scanning means parallel to the original document table;

specification means for specifying the size of the original document placed on the original document table;

detection means for detecting a halt position in which the scanning means has been halted after being moved by the moving means;

comparison means for comparing a first distance between the halt position of the scanning means detected by the detection means and one edge portion, in correspondence to the direction of scanning, of the original document of a size specified by the specification means and a second distance between the halt position of the scanning means detected by the detection means and the other edge portion of the original document;

transfer means for transferring the scanning means to the edge portion of the original document which corresponds to that of the first and second distances which the comparison means has found to be shorter;

receiving means for receiving light reflected from the document on the original document table, the scanning means which has been transferred to the edge portion of the original document, being caused to scan the original document by the moving means; and

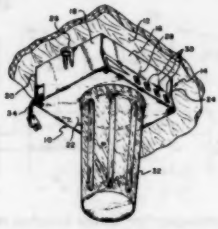
reproducing means for reproducing an original document image received by the receiving means on the recording material.

4,708,487

SPACE SAVER BLENDER

Robert Marshall, 262A Haddon Hills, Haddonfield, N.J. 08033

Filed Oct. 17, 1987, Ser. No. 919,978
Int. Cl.[4] B01F 7/00, 15/00
U.S. Cl. 366—206 13 Claims



1. A blending device mountable on an underside of a wall mounted kitchen type cabinet comprising:

(a) a housing having a top wall, a bottom wall and a front side wall,

(b) a mounting means to mount the housing on the underside of a wall cabinet,

(c) a shaft detent connection means extending through the bottom wall of the housing to disengageably connect to a shaft held vertically from the connection means,

(d) a motor drive means to receive electrical current and rotatingly spin the connection means,

(e) control means to vary the rate of rotation of the motor drive means,

(f) wiring means to electrically connect the motor drive means and the control means to an electrical power source,

(g) annular threads molded into and extending downwardly from the bottom wall of the housing positioned with the connection means in the center of the annular threads,

(h) a cylindrical cup shaped container having an open top, a top edge of the cup around the periphery of the open top, a bottom, and annular threads proximate to the top edge of the container, the threads being of size and shape to engage the annular threads from the bottom wall and hold the container upright to the housing, and

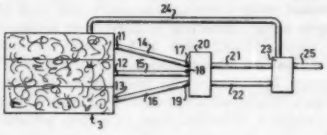
(i) the shaft having an upper end and a lower end disengagingly connected at the upper end to the connection means and a blender blade means secured to the lower end of the shaft and extending outwardly from the shaft to vigorously blend and mix liquids and solids in the container when rotated at a high rate of speed by the motor drive means.

4,708,488

MIXER FOR WATER AND WASTE MATERIAL

Tor S. Ericsson, Danderyd, Sweden, assignor to Cementa AB, Danderyd, Sweden

Filed Oct. 31, 1985, Ser. No. 793,297
Claims priority, application Sweden, Oct. 31, 1985, 8405458
Int. Cl.[4] B28C 5/00
U.S. Cl. 366—2 12 Claims



1. Method of slurrying powdered material with varying

water contents, characterized in that the material is provided with water and is alternatingly subjected to pressure and suction from below through a screen arrangement which prevents coarse aggregate from passing through.

4,708,489

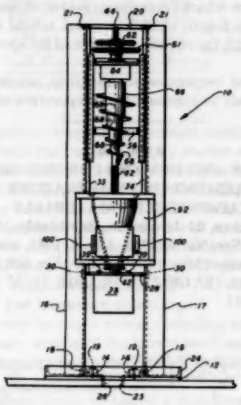
BLENDING MACHINE

Gary Carlson, Cherry Hill, N.J., assignor to Wizards Ice Cream & Confectionery Shoppe, Ltd., Chicago, Ill.

Continuation of Ser. No. 616,965, Jun. 4, 1984, abandoned. This application Jan. 9, 1987, Ser. No. 1,708

Int. Cl.[4] A23G *9/00*; B01F *7/24*

U.S. Cl. 366—149 **8 Claims**



1. A blending apparatus comprising:

a blending container;

auger means displacable into and out of said blending container;

said auger means being rotatable within said container for mixing ingredients contained in said blending container and having cutter means rotatable with respect to said auger means, said cutter means being rotatable at a different angular velocity from said auger means and in the same angular direction as said auger means, said cutter means being effective to cut large poritons of said ingredients contained in said blending container into smaller portions; and

means for causing recirculation of at least a portion of the ingredients within the container during mixing.

4,708,490

ADVANCE DATE WARNING SYSTEM

Amihadar Arber, 4863-A Enfield, Skokie, Ill. 60077

Continuation-in-part of Ser. No. 827,750, Feb. 10, 1986, Pat. No. 4,630,934. This application Dec. 22, 1986, Ser. No. 945,651

Int. Cl.[4] G04B *19/24*; G09D *3/00*

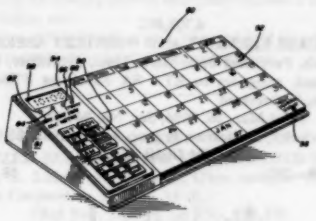
U.S. Cl. 368—28 **16 Claims**

1. An electronic advanced date warning system, comprising:

a base having a front surface;

means associated with said front surface for lighting selected areas thereon, said areas including a first warning area to be activated when a programmed date is reached and at least one advanced warning area to be activated in advance of said programmed date;

circuit means for selectively activating and de-activating said lighting means to light at least one of said selected areas; and



control and memory means for programming said circuit means.

4,708,491

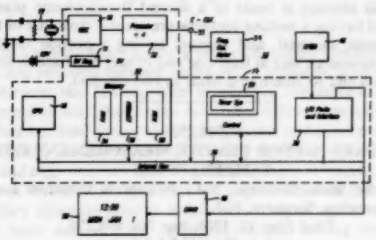
TIME OF DAY CLOCK

William V. Laitje, Ann Arbor, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed May 27, 1987, Ser. No. 54,646

Int. Cl.[4] G04C *13/08*

U.S. Cl. 368—156 **6 Claims**



1. A firmware/hardware time-of-day clock system for deriving a fundamental interval of time from a clock signal of an inherent frequency emanating from an untrimmed crystal oscillator, said fundamental interval of time being used to provide regulated seconds, minutes, hours and months time intervals, said system comprising:

(a) means for continuous counting of the clock cycles of the inherent frequency clock signal from the crystal oscillator;

(b) means for repeatedly indicating when a chosen number of clock cycles of the inherent frequency clock signal has been counted by said clock cycle counting means, said indicating means including means permitting modifying said chosen number of clock cycles to be counted by said clock cycle counting means;

(c) means for generating an interrupt signal each time said chosen number of clock cycles have been counted;

(d) means for counting a predetermined number of interrupt signals generated by said interrupt signal generating means;

(e) first incrementing means for incrementing a 60-second counter upon said counting of said predetermined number of interrupt signals by said interrupt signal counting means;

said first incrementing means including (1) means for resetting said interrupt signal counting means upon incrementing said 60-second counter; and (2) means for adding a predetermined correcting number to said chosen number of clock cycles indicating means for modifying said chosen number of clock cycles of the remaining inherent frequency clock signal to be counted to a value equal to

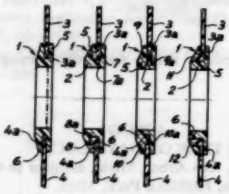
the chosen number plus the correcting number so as to establish a fundamental interval of time.

4,708,492

WATCH CASE ELEMENT AND WRISTLET ASSEMBLY

Elmar Mock, Pery, and Jean-Marie Hotz, Frinvillier, both of Switzerland, assignors to ETA SA Fabriques d'Ebauches, Grenchen, Switzerland

Filed Mar. 26, 1986, Ser. No. 844,443
Claims priority, application France, Apr. 2, 1985, 85 05107
Int. Cl.[4] G04B *37/00*
U.S. Cl. 368—282 **18 Claims**



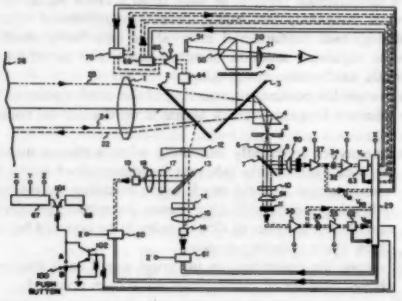
1. An assembly including at least a watch case element and a wristlet comprising at least one band, wherein at least one end of said band is made of a first thermoplastic plastic material and said element is made of a second thermoplastic plastic material having a melting temperature greater than that of the first plastic material, said element having a portion thereof which surrounds said at least one end of said band and is solid with said end to attach said band to said element.

4,708,493

APPARATUS FOR REMOTE MEASUREMENT OF TEMPERATURES

Alexander Stein, Secaucus, N.J., assignor to Quantum Logic Corporation, Secaucus, N.J.

Filed May 19, 1986, Ser. No. 864,276
Int. Cl.[4] G01J *5/30*
U.S. Cl. 374—128 **11 Claims**



1. Apparatus for remotely reading the temperature of a thermally radiating target which radiates over a band of wavelengths which includes first and second spaced wavelengths, said target having an unknown emissivity characteristic at which the emissivity at one wavelength may but does not necessarily differ from the emissivity of another wavelength, said apparatus comprising:

first means responsive to that portion of the thermal radiation at said first wavelength which impinges on said first means to derive therefrom a first electrical signal which varies monotonically with the thermal radiation at said first wavelength;

second means responsive to that portion of the thermal radiation at said second wavelength which impinges on said second means to derive therefrom a second electrical signal which varies monotonically with the thermal radiation at said second wavelength;

third means to direct a first beam of radiation at said first wavelength upon said target whereby a portion of said first beam is reflected from said target;

fourth means to direct a second beam of radiation at said second wavelength upon said target whereby a portion of said second beam is reflected from said target;

fifth means responsive to that portion of the first reflected beam which impinges on said fifth means to derive therefrom a third electrical signal which varies monotonically therewith with the reflected portion of the first reflected beam;

sixth means responsive to that portion of the second reflected beam which impinges on said sixth means to derive therefrom a fourth electrical signal which varies monotonically with the reflected portion of the second reflected beam; and

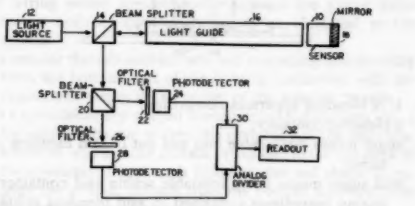
seventh means responsive to said first, second, third and fourth signals to compute the temperature of said target.

4,708,494

METHODS AND DEVICES FOR THE OPTICAL MEASUREMENT OF TEMPERATURE WITH LUMINESCENT MATERIALS

Marcos Kleinerman, 24 Jerome St., Southbridge, Mass. 01550

Continuation of Ser. No. 405,732, Aug. 6, 1982, abandoned. This application May 14, 1984, Ser. No. 608,932
Int. Cl.[4] G01J *05/58*; G01K *11/12*
U.S. Cl. 374—161 **22 Claims**



1. A method for measuring the temperature of an object or environment, comprising the steps of:

(a) placing a temperature sensor in a heat flow relationship with said object or environment, said sensor consisting of a material containing luminescence centers characterized by absorbing, when illuminated with light within a defined spectral region from said luminescent material, a fraction of the intensity of said illuminating light incident on said sensor, said fraction varying as a known function of the temperature of said sensor, said sensor emitting luminescence light with an intensity that varies as a known function of the intensity of said absorbed light,

(b) illuminating said sensor with excitation light within said defined spectral region, thereby causing the absorption of said temperature-dependent fraction of the intensity of said light, the transmission of the non-absorbed fraction of the intensity of said light, and the emission of luminescence light within a spectral region characteristic of said luminescent centers, the intensity of said luminescence light being related to said temperature-dependent absorbed fraction of the intensity of the excitation light,

(c) directing said luminescence light from said sensor to a photo-detector, and

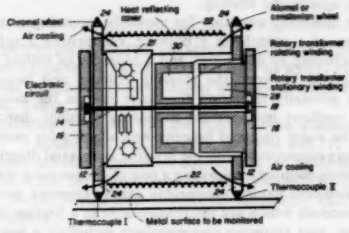
(d) measuring the intensity of said luminescence light, said intensity being an indicator of the temperature of said sensor, and related to the temperature of said object or environment.

4,708,495

METAL SURFACE TEMPERATURE MONITOR

Frank Kitzinger, Montreal, and Vladimir M. Labuc, Hudson, both of Canada, assignors to Noranda Inc., Toronto, Canada

Filed Jan. 21, 1986, Ser. No. 820,953
Claims priority, application Canada, Apr. 23, 1985, 479758
Int. Cl.[4] G01K *13/04, 7/08*
U.S. Cl. 374—154 7 Claims



1. A metal surface temperature monitor comprising:

(a) a sensor head having a stationary section and a rotating section, said rotating section including two wheels fabricated from thermocouple materials and adapted to ride on the surface of the metal and generate an EMF which relates to the temperature of the metal surface;

(b) a converter associated with the rotating section of the sensor head and responsive to the EMF generated by the wheels of thermocouple materials for converting said EMF to a low frequency coded signal;

(c) a transformer having a primary winding associated with the stationary section of the sensor head and a secondary winding associated with the rotating section of the sensor head;

(d) a modulating circuit including a high frequency power oscillator connected to the primary winding of the transformer for generating a high frequency signal in said primary winding and means connected to the secondary winding of the transformer and responsive to said converter for modulating said high frequency signal by said low frequency coded signal for transferring the low frequency coded signal from the secondary to the primary winding of the transformer; and

(e) means connected to the primary winding of the transformer for demodulating the low frequency coded signal to provide an indication of the temperature of the metal surface.

4,708,496

DIAMOND BEARING AND MANUFACTURE THEREOF

James N. McPherson, Orange, Calif., assignor to Smith International, Inc., Newport Beach, Calif.

Filed May 20, 1986, Ser. No. 865,159
Int. Cl.[4] F16C *17/04, 43/02;* B21D *39/04*
U.S. Cl. 384—303 20 Claims

1. A bearing structure comprising:

a support member having a race;

a generally planer retainer ring having a number of holes therein;

a plurality of bearing inserts, one insert mounted in each of said holes; and

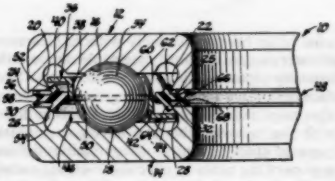
brazing material attaching said ring and said inserts to said race and attaching said inserts to said ring.

4,708,497

UNITIZED BEARING WITH FREE MOLDED SEALS

Frederick E. Lederman, Sandusky, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 3, 1986, Ser. No. 926,270
Int. Cl.[4] F16C *33/78*
U.S. Cl. 384—448 3 Claims



1. In a bearing having rolling bearing elements retained by a cage and received between pathways of a pair of axially opposed races, said bearing, after installation, operating under a compressive load that forces said races axially together, but subjected to axial forces tending to separate said races prior to installation, the improvement including free molded seals and race and cage structure that cooperate to seal said bearing at all times as well as to retain said races, cage and seals together as a unitary structure prior to installation, comprising,

an inner and an outer generally conical sealing surface formed substantially identically into each race coaxial to and bordering each pathway,

retention members formed on said cage and located so as to interfit with each of said races with a predetermined axial clearance, thereby reducing friction while said bearing operates, but preventing said races from axially separating by more than said predetermined axial clearance,

a substantially cylindrical wall on said cage having a diameter less than said outer sealing surfaces,

a generally annular elastomeric free molded outer seal having a free inner diameter less than said cage cylindrical wall, whereby said outer seal may be supported by stretching it over said cage cylindrical wall, thereby maintaining said outer seal in radially outwardly tensioned sealing engagement with said outer sealing surfaces independently of the axial forces acting on said bearing, said cage retention members, by preventing said races from axially separating by more than said predetermined clearance, thereby also preventing said outer seal and said outer sealing surfaces from axially disengaging, and,

a generally annular elastomeric free molded inner seal having a smaller free inner diameter than said inner sealing surfaces whereby said inner seal may be supported by stretching it over said inner sealing surfaces so as to maintain it in radially inwardly tensioned sealing engagement therewith independently of the axial forces acting on said bearing, said cage retention members similarly preventing said inner seal and said inner sealing surfaces from axially disengaging, whereby both the inner and outer sides of said bearing are sealed and said bearing is maintained as a unitary structure prior to installation.

4,708,498

LOCALLY PRE-STRESSED ROLLING BEARING FOR MOUNTING ON A SHAFT IN A LATERAL DIRECTION

Jean-Denis Labedan, and Michel Merle, both of Vierzon, France, assignors to Nadella, Vierzon, France

Filed Aug. 5, 1986, Ser. No. 893,340
Claims priority, application France, Aug. 6, 1985, 85 12014
Int. Cl.[4] F16C 27/06
U.S. Cl. 384—560 15 Claims

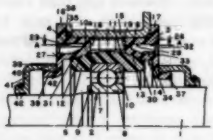
1. A radial roller bearing assembly without clearance comprising, an outer case, as elastically yieldable sleeve in the case, a thin elastically yieldable ring in the sleeve and having an inner surface defining a raceway, a cage, roller elements carried by the cage and disposed within the ring for rolling contact with the raceway, the ring having in a plurality of angularly spaced apart regions of discontinuities defining prestressed regions of the raceway effective to ensure radial deformation for effecting localized gripping of the roller elements in response to action of the sleeve when the roller bearing assembly is mounted on a shaft, the outer case, the sleeve, the ring and the cage each having means on each of the outer case, the sleeve, the ring and the cage for permitting opening thereof laterally for mounting of the roller bearing assembly by a lateral engagement of the roller bearing assembly circumferentially on said shaft between opposite ends thereof without need of slipping the roller bearing assembly over one of the ends of said shaft.

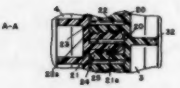
4,708,499

PIVOT BEARING FOR STEERING COLUMNS OF MOTOR VEHICLES

Norbert Löser; Leopold Tilgner, both of Püttlingen, and Jürgen Scholer, Siersburg, all of Fed. Rep. of Germany, assignors to SKF Gleitlager GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Aug. 11, 1986, Ser. No. 895,048
Claims priority, application Fed. Rep. of Germany, Aug. 16, 1985, 3529316
Int. Cl.[4] F16C 43/04, 33/76, 27/06, 23/08
U.S. Cl. 384—539 10 Claims





1. Pivot mounting assembly for movably mounting a steering column of a vehicle in a housing, comprising a rolling bearing including an outer ring and a plurality of rolling elements disposed between the steering column and housing, means for pivotally mounting the outer ring in the housing including resilient intermediate mounting member disposed between the outer ring and housing and adapted for positive form locking connection with the housing in an axial direction said mounting member comprising a pair of cooperating retaining ring members having cooperable axially oriented projectors and recesses which are interengageable in a friction locking manner, said retaining ring members including a seat for the bearing configured to allow a degree of pivotal movement and means for mounting the ring members elastically under pretension against the bearing.

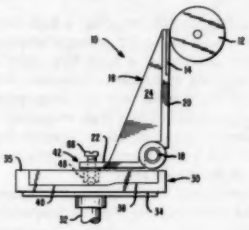
2. Pivot mounting assembly for movably mounting a steering column of a vehicle in a housing, comprising a rolling bearing including an outer ring and a plurality of rolling elements dispcsed between the steering column and housing, means for pivotally mounting the outer ring in the housing including resilient intermediate mounting member disposed between the outer ring and housing and adapted for positive form locking connection with the housing in an axial direction, said mounting member comprising a pair of cooperating retaining ring members having cooperable axially oriented projectors and recesses which are interengageable in a friction locking manner, said retaining ring members including a seat for the bearing configured to allow a degree of pivotal movement and means for mounting the ring members elastically under pretension against the bearing, said retaining rings (3, 4) having outer axial end surfaces and including means defining recesses (28, 29) and elastic sections (30, 31) in said axial end surfaces.

4,708,500

THERMAL PRINTER

Richard G. Bangs, and Michael O. Grey, both of Ithaca, N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed Jan. 13, 1986, Ser. No. 818,413
Int. Cl.[4] B41J 3/20, 25/28
U.S. Cl. 400—120 6 Claims



1. A thermal printer comprising

a platen,

a print head adjacent the platen for printing on record media positioned between the print head and the platen,

carriage means for supporting and for moving the print head in first and second directions across the printer, and

means operably associated with the carriage means and including a cam mechanism comprising a plate-like cam member having a continuous irregular groove therein and a cam follower ball operating in the groove, said groove defining a portion of one depth for the cam follower ball in the first direction for printing operation and defining a portion of another depth for the cam follower ball in the second direction for return operation, said cam mechanism including a cylindrical member having a resilient member captured therein and means adjustably threaded into said cylindrical member for adjusting the force exerted by the resilient member on said cam follower ball, said adjustably threaded means and said resilient member biasing said cam follower ball into contact with said one and said another depth portions of said groove for holding the print head in printing condition with a predetermined

pressure of the print head against the record media and the platen when the print head is moving in the first direction and for releasing the pressure of the print head relative to the record media and the platen when the print head is moving in the second direction.

4,708,501

ELECTROMAGNETIC HAMMER PRINTING DEVICE INCLUDING A LIMITED ACTION SPRING FORCE

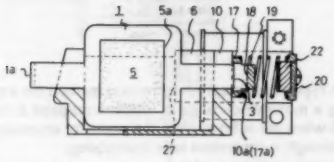
Takeshi Takemoto, Yamato, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 654,259, Sep. 25, 1984, abandoned. This application Aug. 14, 1986, Ser. No. 898,727

Claims priority, application Japan, Sep. 26, 1983, 58-177669; Sep. 26, 1983, 58-177668; Sep. 26, 1983, 58-148385[U]; Sep. 30, 1983, 58-151740[U]; Oct. 6, 1983, 58-155580[U]; Oct. 6, 1983, 58-155581[U]

Int. Cl.⁴ B41J *9/38*

U.S. Cl. 400—157.2 **7 Claims**



1. An electromagnetic printing hammer device for impacting the back of a type element comprising:

an electromagnetic having coils and a pair of electromagnetic pole-faces spaced apart from each other by a gap;

a hammering element including a permanent magnet mounted in at least one portion thereof and located in said gap for linear movement in a plane parallel to said electromagnetic pole-faces, said hammering element having a thrust applied thereto as a pulse current is applied to the electromagnet coils so as to exert a force of impact in a forward direction on the back of a type element, said hammering element having front and rear shaft portions;

a pair of bearings which journal said hammering element at the front and rear shaft portions respectively for forward and backward movement of said hammering element, wherein the bearing for the rear shaft portion has a rear surface;

a spring mounted in the device to exert a biasing force on the hammering element in a ready position and to urge the hammering element forwardly when the thrust of the electromagnet is applied thereto so as to increase the force of impact exerted thereby on a type element;

wherein said hammering element and pole-faces of said electromagnet are disposed so that when said electromagnet is not energized, a magnetic attraction occurs between said permanent magnet and said pole-faces which is stronger than the biasing force of the spring to hold the hammering element in the ready position, and when said electromagnet is energized, said hammering element is driven by both a repulsive force between said permanent magnet and said pole-faces of said electromagnet and the biasing force of the spring; and

stopping means for stopping said biasing force of said spring without stopping the inertia force of said hammering element, wherein said stopping means is formed by said rear surface of said bearing for said rear shaft portion of said hammering element.

4,708,502

MOUNTING MECHANISM FOR A PRINT HEAD

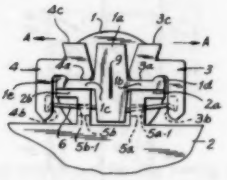
Kenjiro Murakami, Suwa, Japan, assignor to Seiko Espon Kabushiki Kaisha, Japan

Filed Mar. 24, 1986, Ser. No. 843,355

Claims priority, application Japan, Mar. 26, 1985, 60-61467

Int. Cl.⁴ B41J *1/60*

U.S. Cl. 400—175 **11 Claims**



1. A mounting mechanism for mounting a print head on a carriage of a printer comprising positioning means coupled to said carriage for positioning said print head thereon, engagement means on said print head for releaseably engaging with said positioning means to position said print head on said carriage, first and second lever means pivotably coupled to said carriage on opposite sides of said print head for releaseably locking said print head to said carriage and pivotable between a first position where said print head is locked to said carriage and a second position where said print head is released, said print head being positioned intermediate said first and second lever means, and biasing means for biasing said first and second lever means in a closed position when said first and second lever means are pivoted to said first position to press said print head against said carriage and in an open position when said first and second lever means are pivoted to said second position, said biasing means including spring means supported on said carriage and extending to engage with said first and second lever means, said first lever means including a first slot and said second lever means including a second slot, said spring means extending into said first and second slots in said first and second lever means, respectively, to hold said first and second lever means on said carriage, said spring means serving to bias said first and second lever means when in said first position so as to urge said first and second lever means to remain in said first position and likewise, to bias said first and second lever means when in said second position so as to urge said first and second lever means to remain in said second position.

4,708,503

WORK CARRIER FOR USE IN COMPUTER PRINTING

David D. S. Poor, Meadowbrook, Pa., assignor to Meadowbrook Industries, Inc., Pa.

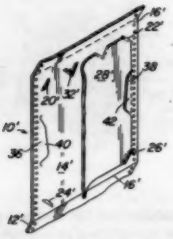
Continuation of Ser. No. 714,241, Mar. 21, 1985, abandoned, which is a continuation-in-part of Ser. No. 512,542, Jul. 11, 1983, abandoned. This application Jan. 7, 1987, Ser. No. 4,231

Int. Cl.⁴ B41J *13/12*

U.S. Cl. 400—531 **9 Claims**

1. For use in association with a microcomputer printer, a ready-made reusable carrier for work to be printed, comprising: a web so dimensioned as to be adapted for insertion into and movement through a microcomputer printer, said web having a plurality of panels connected in edge-to-edge and defined by fold lines extending transversely across said web and work securing means associated with said panels whereby work to be printed can manually be temporarily coupled to said panels before insertion of said web into the printer and removed from said web without destruction of said web after printing, said work securing means comprising a plurality of ready-made openings in said panels, said openings being positioned and arranged on said panels in correspondence with the dimensions of the work with which the carrier is intended to be

used and so disposed on said panels as to be adapted to receive and retain respective corners of the work; said work securing means further comprising edge-constraining members cut from said web, said edge-constraining members comprising flap members elongated in the direction of said web and having distal portions thereof projecting tranaversely inwardly with respect to the lateral edges of said web and adapted to engage and overlie lateral edges of the work, said flap members being defined by perforations of said web which comprise a first



segment extending in a direction downstream with respect to said web and angled obliquely inwardly with respect to the lateral edge of said web, a aecond segment extending in a direction upstream with respect to said web and angled obliquely inwardly with respect to the lateral edge of said web, and a transitional segment elongated in the direction of said web and interconnecting said first and said second segment, said transitional segment extending obliquely inwardly respect to the lateral edge of said web in direction downstream with respect to said web.

4,708,504

PINCH ROLLER ASSEMBLY FOR SHEET FEEDING

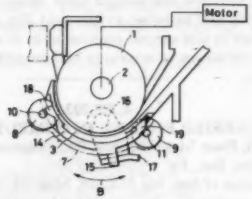
Osamu Asakura, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 2, 1986, Ser. No. 881,282

Claims priority, application Japan, Jul. 10, 1985, 60-151875

Int. Cl.[4] B41J *13/054*

U.S. Cl. 400—637 **14 Claims**



1. A sheet feeding apparatus comprising:

a feed roller for feeding a sheet of paper;

drive means for driving said feed roller;

a sheet guide disposed about a substantial portion of the periphery of said feed roller;

opposed rotating members mounted so as to be able to be pressed against and separated from said feed roller, wherein said rotating members cooperate with said feed roller to convey the sheet of paper when said rotating members are pressed against said feed roller with the sheet of paper therebetween;

biasing means for biasing said rotating members; against said feed roller; and

separating means extending about a substantial portion of said sheet guide and movable between an operative position, wherein said rotating members are separated from said feed roller against said biasing means, and an inoperative position, wherein said rotating members are pressed against said feed roller by said biasing means, said separating means being movable about and guided by said sheet guide for movement between the operative and inoperative positions.

4,708,505

TYPEWRITER MISPRINT CORRECTION METHOD

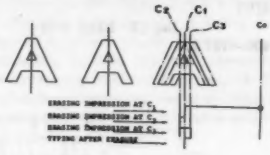
Takeo Tsumura, Matsubara; Hiroji Iwai, Yamatokoriyama, and Atsushi Kadoya, Kitakatsuragi, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 25, 1985, Ser. No. 801,584

Claims priority, application Japan, Nov. 27, 1984, 59-250997; Nov. 27, 1984, 59-250998

Int. Cl.[4] B41J *29/34, 33/36*

U.S. Cl. 400—697.1 **6 Claims**



1. A typewriter misprint correction method for a typewriter having a movable carriage in which a misprint is completely erased when ink is lifted from the paper by an erasing impression through a correction tape comprising:

positioning said movable carriage over the center of said misprint;

making said erasing impression through said correction tape and adjusting the position of said movable carriage to overlap a part of said misprint, said erasing impression being conducted two or more times for said misprint; and

feeding a prescribed length of correction tape after at least one erasing impression has been made, said step of feeding supplying a total length of said correction tape used in erasing said misprint which is less than or equal to the width of one character position, said step of feeding a prescribed length of correction tape is determined by feeding said correction tape a length "P/N" before or after each erasing impression, wherein the correction tape feed length required for erasing a single character is "P" and the number of erasing impressions for a single character is "N".

4,708,506

INK SUPPLY SYSTEM WITH TUBE PUMP

Günther Herrnring, Alvesloe, Fed. Rep. of Germany, assignor to Montblanc-Simplo GmbH, Hamburg, Fed. Rep. of Germany

Division of Ser. No. 620,162, Jun. 13, 1984, Pat. No. 4,634,305. This application Sep. 10, 1986, Ser. No. 905,878

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1983, 3321301

Int. Cl.[4] B43K *5/06, 5/08, 5/18*

U.S. Cl. 401—151 **5 Claims**

1. An ink supply system for a writing instrument which operates with liquid ink; said system comprising:

a housing for said writing instrument, said housing including a primary large-volume reservoir for ink, and a secondary, small-volume reservoir;

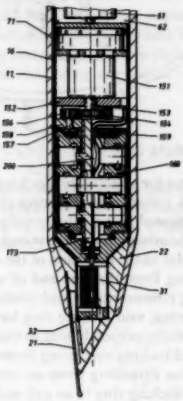
a writing element connected to said housing; said secondary reservoir communicates with outside air and with said writing element;

a tube pump which acts as a recharge valve, is controllable as a function of need, and connects said large-volume reservoir to said small-volume reservoir;

which includes, as a drive mechanism for said tube pump, an electric motor in said housing; and which includes a battery in said housing for said electric motor;

which includes a sensor associated with said secondary reservoir for monitoring the content thereof, and for controlling said drive mechanism for effecting said control of said tube pump;

said large-volume reservoir being in the form of a replaceable ink cartridge; said housing including a seat for said cartridge, and associated with said seat, a spring contact arrangement for disconnecting said battery from said drive mechanism when no ink cartridge is provided on said seat;



said ink cartridge being essentially at atmospheric pressure, and the pressure necessary to convey ink from said cartridge to said secondary reservoir is produced by said tube pump;

said tube pump being a peristaltically-operating tube pump having a tube which essentially extends in the axial direction of said housing;

said tube pump being provided with at least three successively connected chambers, each of which includes a radially moved piston, and has a portion of said tube disposed therein; said pistons successively and periodically squeeze together said portions of said tube.

4,708,507

DISPENSER WITH FINGER SLOT

Alfred von Schuckmann, Kervendonk 63, D-4178 Kevelaer 2, Fed. Rep. of Germany

Filed Jan. 22, 1986, Ser. No. 821,482

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1985, 3502605

Int. Cl.[4] A47L *23/04, 23/05*

U.S. Cl. 401—171 **6 Claims**

1. A dispenser for dispensing shoe polish, said dispenser comprising:

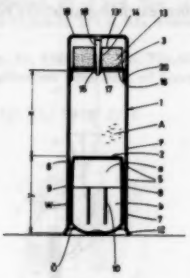
a cylindrical housing having a peripheral wall, an end wall and an open end;

an applicator mounted on the end wall of said cylindrical housing;

a manually-movable piston mounted within said housing, said piston comprising a peripheral shell wall, and a transverse end wall;

the interior of said housing intermediate said housing end wall and said transverse end wall of said piston comprising a material-receiving space;

the length of said piston being substantially equal to the length of the contents-receiving space when said piston is in its retractable position;



said peripheral wall of said housing having an axial finger-receiving slot extending inwardly from said open end toward said housing end wall.

4,708,508

INK GUIDE FOR WRITING INSTRUMENTS

Masamitsu Nagahama, Saitama, and Kazunori Suzuki, Soka, both of Japan, assignors to Pentel Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 29, 1985, Ser. No. 803,658

Claims priority, application Japan, Nov. 30, 1984, 59-253248; Feb. 27, 1985, 60-38464; Mar. 30, 1985, 60-67418

Int. Cl.[4] B43K *5/00*

U.S. Cl. 401—199 **5 Claims**

1. An ink guide for a writing instrument, made of a synthetic resin consisting essentially of the following features (a) to (d) in the molecular structure or a derivative of said synthetic resin:

(a) a benzene nucleus is present in a main chain of the molecule;

(b) said benzene nucleus is coupled by an ether linkage;

(c) said ether linkage comprises two ether linkages in recurrence; and

(d) the molecule of the synthetic resin comprises a ketone group.

4,708,509

APPARATUS FOR SUPPORTING AND STORING ENGINEERING DRAWINGS AND THE LIKE

Juanita L. Brunett, 41183 Southward, Canton Township, Wayne County, Mich. 48188

Filed Aug. 18, 1986, Ser. No. 897,480

Int. Cl.[4] B42F *3/00, 15/06, 13/40;* **A47B** *63/06*

U.S. Cl. 402—4 **1 Claim**

1. Apparatus for supporting and storing large size paper sheets comprising a plurality of longitudinally aligned ring binder assemblies each of which includes a plurality of ring members which can be opened and closed and extended through holes formed in paper sheets to be supported, an elongated support member for said ring binder assemblies, at least one hinge assembly connected to and extending between said ring binder assemblies and said support member to enable pivotal movement of said ring members relative to said support

member including means enabling disposition of said support member in a horizontal position with said ring binder assemblies therebelow and extending downwardly therefrom with said ring members extending generally horizontally to one side

of said hinge assembly so that paper sheets can hang downwardly from said ring members, said apparatus being movable to a position in which said ring members extend upwardly to one side of said support member to facilitate laying of paper sheets on said ring members on a horizontal table surface.

4,708,510

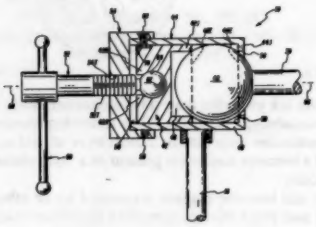
BALL JOINT COUPLING

Bernard E. McConnell, Rte. 2, Box 87, and Thomas E. McConnell, Rte. 5, Box 2205, both of Greenville, Tex. 75401

Filed Apr. 17, 1986, Ser. No. 853,209

Int. Cl.[4] F16C *3/00*

U.S. Cl. 403—90 **6 Claims**



6. A ball joint coupling assembly comprising, in combination:

a housing having a bore defining a coupling chamber and having an annular jaw defining a pivot opening;

a ball member received in said housing bore and engaging the circumferential edge of said housing annular jaw in line contact,

a support arm attached to said ball member and projecting through said pivot opening;

a piston movably disposed in said housing bore, said piston having an annular jaw and a circular edge formed on said piston jaw engaging said ball member in line contact; and,

means coupled to said piston for moving said piston through said coupling chamber into engagement with said ball member thereby compressing said ball member between the circular edge of said piston jaw and the circular edge of said housing jaw, and for retracting said piston through said coupling chamber for disengaging said piston jaw from said ball member.

4,708,511

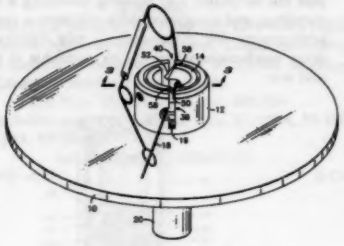
AXIAL MOVEMENT BLOCKING APPARATUS

Robert E. Edminster, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 23, 1986, Ser. No. 889,447

Int. Cl.[4] F16B *7/00*

U.S. Cl. 403—316 **17 Claims**



1. An apparatus for selectively blocking movement of a shaft in a direction of a shaft axis, the apparatus comprising:

a housing mounted to be substantially concentric with the shaft, said housing having a first end residing substantially perpendicular to the direction of the shaft axis and an axial slit extending from the first end of said housing;

a locking ring concentrically and rotatably mounted relative to said housing, said locking ring having a first end residing substantially perpendicular to the direction of the shaft axis and said locking ring being formed to have an inclined plane portion extending from an entrance end at the first end of said locking ring to an exit end, and a notch located adjacent to the exit end of the inclined plane, axially away from the first end of said locking ring;

a resilient member coupled to said housing and locking ring to urge said locking ring to rotate relative to said housing; and

a blocking pin located within said notch to block axial movement of the shaft past said pin.

4,708,512

CLAMPING SHELL

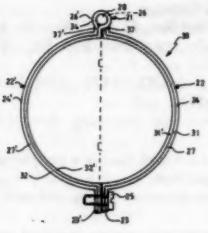
Kurt Allert, Panoramaweg 3, 7238 Oberndorf, Neckar, Fed. Rep. of Germany

Filed Feb. 24, 1986, Ser. No. 833,329

Claims priority, application Fed. Rep. of Germany, Feb. 23, 1985, 3506385

Int. Cl.[4] F16B *2/02*

U.S. Cl. 403—344 **21 Claims**



1. A pivotally unfoldable clamping shell for releasably embracing and clamping parts to one another, comprising in combination

two one-piece strip members defining respective half-shell regions, each having first and second ends, a center line

being defined between said first and second strip member ends,

hinge means pivotally connecting said strip members near the first ends thereof, each second end of a corresponding strip member being bent so as to form a flange extending substantially parallel to said center line, and

clamping means arranged at said flanges of said strip members and operative for drawing said strip members toward one another and toward said center line for clampingly engaging said half-shell regions,

each strip member including two strip elements juxtaposed with one another in a corresponding half-shell and flange region thereof and having respective major surfaces which face each other and are in an area contact with one another at said half-shell and flange regions thereof,

said hinge means including first and second lugs, at least one of said lugs being formed by the strip elements of a corresponding strip member being connected to one another.

4,708,513

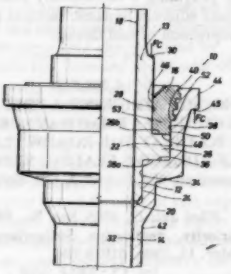
FATIGUE RESISTANT COUPLING FOR TUBULAR MEMBERS

Joseph R. Roche, Humble, and Shaw-Wen Lin, Houston, both of Tex., assignors to Hydril Company, Los Angeles, Calif.

Filed Sep. 6, 1985, Ser. No. 773,031

Int. Cl.⁴ F16B *21/00*

U.S. Cl. 403—361 **5 Claims**



2. An extended fatigue life coupling adapted for securing a pair of tubular members in a force transmitting relationship, comprising:

a tubular pin member having an outer surface and having a torus formed on said outer surface, said torus forming a first annular shoulder and a second annular shoulder;

a tubular box member having an inner surface with threads formed on a portion of said inner surface, said box member telescopically receiving said pin member until engagement of said inner surface with said first annular shoulder of said torus;

means on said pin and box engageable by a loading tool for applying a compression preload to said torus;

a locking ring carried adjacent said outer surface of said pin member, said lock ring having threads formed thereon for rotational make-up with said threads on said box member when said pin member is telescopically inserted into said box member, said lock ring when made-up being in compression while bearing against said second annular shoulder of said torus and maintaining said previously applied compression preload on said torus, and

the geometries of said torus, box member and locking ring arranged such that the stiffness of said torus is relatively higher than the stiffness of said box member and is relatively higher than the stiffness of said locking ring.

4,708,514

RESILIENT SHAFT COUPLING

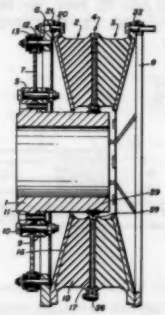
Jurgen Walter, Haltern-Hullern; Ulrich Falz, and Manfred Lunke, both of Dortmund, all of Fed. Rep. of Germany, assignors to Hackforth G.m.b.H. & Co. KG, Herne, Fed. Rep. of Germany

Filed Sep. 16, 1985, Ser. No. 776,603

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1984, 3434722

Int. Cl.⁴ F16D *3/56*

U.S. Cl. 403—372 **7 Claims**



1. A coupling including:

a hub for rotating about a longitudinal axis;

a resilient ring assembly including at least two axially-contiguous circular ring parts supported radially upon said hub, each ring part comprised of semi-circular ring sector units wherein each ring sector unit includes an elastomeric ring sector and ring sector plates with said ring sector plates fixedly connected to opposite axial ends of each elastomeric ring sector, each ring sector unit of one circular ring part overlapping two ring sector units of the other axially contiguous circular ring part;

a drive ring drivingly interconnecting said hub and said resilient ring assemly at one axial end thereof to rotate about said longitudinal axis;

fastener means for securing together the ring sector plates at one axial end of each of the two circular ring parts when in a confronting relation; and

a coupling part secured to one of said ring parts at an end which is opposite said drive ring.

4,708,515

STOCK BARRIER

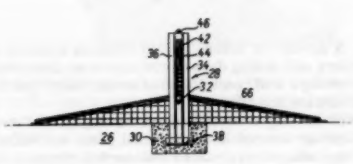
David T. Davies, Erw Bach, The Nant, Pentre Halkyn, Nr. Holywell, Clwyd, CH8 8BD, Wales

Filed Aug. 18, 1986, Ser. No. 897,715

Claims priority, application United Kingdom, Aug. 17, 1985, 8520654

Int. Cl.⁴ E01F *13/00*

U.S. Cl. 404—6 **10 Claims**



1. A stock barrier comprising rigid metal panels of open grid construction, said panels being arranged to be in a normal

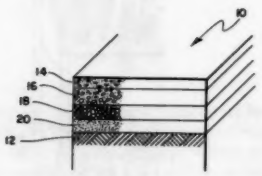
operational position, at an angle to the ground to form a pair of back-to-back ramps across which stock will not cross but which can be flattened to the ground against a resilient return force when a vehicle drives onto same, the panels being pivotable upwards about a side edge thereof whereby to leave a ground path clear for stock to pass through the barrier when required.

4,708,516

ASPHALT PAVEMENT

E. James Miller, 12771 Eveningside Dr., Santa Ana, Calif. 92705

Filed Jun. 22, 1984, Ser. No. 623,559
Int. Cl.[4] E01C *3/00*
U.S. Cl. 404—31 **14 Claims**



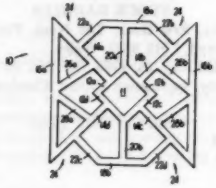
1. A beam-like asphalt pavement structural section for overlying a subgrade comprising, in combination:
   a. at least three layers of material, said layer being arranged in a preselected sequence from said subgrade to an upper surface;
   b. said layers including a bottom layer adjacent said subgrade, a top layer of bounded material defining said upper surface, and an intermediate layer therebetween;
   c. the material of said bottom layer comprised of a dense graded asphalt concrete having a greater tensile strength than the other layers; and
   d. said intermediate layer comprising unbound aggregate filler material of predetermined thickness as to enhance the beam-like action.

4,708,517

COMPRESSION SEAL

John D. Nicholas; Larry M. Petree, both of Lawrenceville, and Julian J. Attaway, Marietta, all of Ga., assignors to MM Systems Corporation, Tucker, Ga.

Filed Sep. 15, 1986, Ser. No. 907,064
Int. Cl.[4] E01C *11/10*
U.S. Cl. 404—64 **5 Claims**



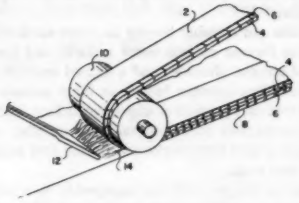
1. A device for sealing a void between adjacent dynamic members, said sealing device produced as an elastomeric extrusion having a wall construction of substantially square shape in cross-section comprising:
   walls defining a central square having two of its opposite corners located in a horizontal plane and its other two opposite corners located in a vertical plane;
   diagonal walls extending radially outwardly substantially from the midpoint of each of said walls defining said central square;
   a pair of opposing outer vertical walls defining the sides of said device, said diagonal walls connecting to and terminating at the top and bottom of said outer vertical walls;
   upper and lower horizontal walls defining the top and bottom of said device and lying substantially in the horizontal planes corresponding to the top and bottom of said outer vertical walls, said upper and lower horizontal walls and said outer vertical walls defining an outer square being the outer perimeter of said sealing device;
   upper and lower bisecting vertical walls extending radially outwardly from the uppermost and lowermost corners of said central square and being connected to and terminating at said upper and lower horizontal walls;
   support members depending downwardly and outwardly from the outer edges of said upper horizontal walls and upwardly and outwardly from the outer edges of said lower horizontal walls, said support members connecting to and terminating at said diagonal walls to form V-shaped indentations between said horizontal walls and said outer vertical walls; and
   substantially diagonal braces extending from the midpoints of each of said outer vertical walls to each of said diagonal walls,
   whereby, when said device is disposed between mutually facing portions of said adjacent dynamic members, forces exerted by said adjacent dynamic members against said outer vertical walls are transmitted through said diagonal walls to said central square, said central square simultaneously flattening and elongating to redirect said forces to said vertical bisecting walls to support said upper and lower horizontal walls as said device is compressed, thereby providing a substantially planar top surface between said adjacent dynamic surfaces at all points during the compression of said device.

4,708,518

METHOD OF ADHERING A PREFABRICATED MARKING STRIP TO A ROADWAY SURFACE WITHOUT HAVING TO TREAT THE ROADWAY SURFACE AND SELF-ADHESIVE SEALING STRIP ITSELF

Ludwig Eigenmann, Via Dufour 3, CH 6900 Lugano, Switzerland

Filed Jul. 22, 1986, Ser. No. 888,175
Claims priority, application Switzerland, Jul. 23, 1985, 03198/85; Mar. 13, 1986, 01019/86
Int. Cl.[4] E01F *9/08*
U.S. Cl. 404—79 **2 Claims**



1. Process for attaching marking strip of the type provided on its underside with an adhesive primer to a roadway surface comprising:
   (a) applying a low viscosity adhesive primer of the type derived from lubricating oil waste to the underside of the marking strip;
   (b) rotatably laying the strip onto the roadway surface; and
   (c) positioning a single elongated flat flame nozzle adjacent the roadway and marking strip, so as to simultaneously apply a pressurized flat shape flame onto the roadway surface and across the underside of the marking strip, while orienting the flat shape flame so as to dry and render

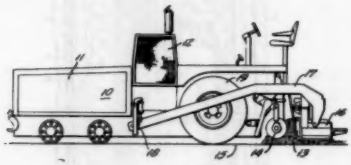
absorbent the roadway surface prior to heating said adhesive primer to melting point, such that the adhesive primer is drawn into the roadway surface as a seal during said laying of marking strip.

4,708,519

ASPHALT PAVING MACHINE WITH LIFTABLE, ADJUSTABLE AUGER MECHANISMS

Donald R. Davin, Shelbyville, and Robert L. Brown, Mattoon, both of Ill., assignors to White Consolidated Industries, Inc., Cleveland, Ohio

Filed Apr. 4, 1986, Ser. No. 848,719
Int. Cl.[4] E01C *19/12*
U.S. Cl. 404—101 **20 Claims**



1. In an asphalt paver or the like of the type having a self-propelled tractor, screed means trailed by said tractor, and power driven auger means, independent of said screed means, mounted at the rear of said tractor for distributing paving material laterally in front of said screed means, said paver having at least certain operating configurations in which said screed means and said auger means are substantially wider than said tractor, the improvement characterized by

(a) an auger drive box mounted at the rear of said tractor generally centrally between its sides,

(b) said auger means comprising left and right side augers,

(c) the respective inboard ends of said augers being rotatably supported and drivingly engaged by said drive box,

(d) means mounting said drive box to said tractor for limited pivotal movement about a generally horizontal pivot axis generally parallel to and forward of said augers, whereby pivotal movement of said drive box results in generally upward/downward movement of said augers,

(e) cantilever-mounted support members carried by said drive box and extending laterally in opposite directions therefrom above said augers,

(f) said augers and said support members, at least in certain operating configurations of said paver, extending laterally beyond the side limits of said tractor,

(g) bearing members extending downward from the outboard ends of said support members and rotatably supporting outboard portions of the respective augers, and

(h) controllable power actuator means for pivoting the assembly comprising said drive box, cantilever-mounted support members and augers about said pivot axis.

4,708,520

CONCRETE FINISHING MACHINE WITH ADJUSTABLE AUGER UNIT

Murray A. Rowe, Canton, S. Dak., assignor to CMI Corporation, Oklahoma City, Okla.

Filed Jan. 30, 1987, Ser. No. 9,355
Int. Cl.[4] E01C *19/23*
U.S. Cl. 404—103 **12 Claims**

1. In a concrete finishing machine of the type embodying an elongated main frame having first and second ends, height adjusting means for adjusting the vertical height of the main frame, means for moving the main frame longitudinally along a roadway or the like being surfaced, a surfacing unit for finishing a concrete surface, and means for moving the surfacing unit longitudinally back and forth along the main frame between its first and second ends, said surfacing unit comprising:

a carriage;

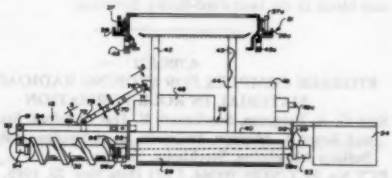
finishing cylinder means;

means rotatably mounting said cylinder means in said main frame;

drive means coupled to said cylinder means for rotating said cylinder means;

first and second augers;

auger support means including an auger support frame extending generally axially of said cylinder means, said auger support frame having a forward end and a rearward end, mounting means pivotally mounting said auger support frame at its rearward end to said carriage, suspension means on said auger support frame near the forward end thereof and extending downwardly therefrom supporting forward ends of said first and second augers, and flexible coupling means coupling rearward ends of said first and second augers to said cylinder means, whereby said augers are rotated by said drive means as said cylinder means is rotated,



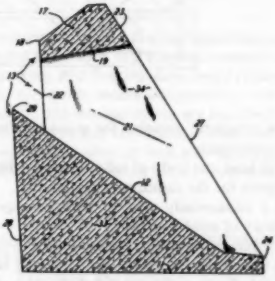
and adjustable support means connected between said carriage and said auger support frame, said adjustable support means adjustable to vary the angle of inclination of said auger support frame and the augers supported thereby relative to the longitudinal axis of said cylinder means.

4,708,521

BEACH BUILDING BLOCK

Peter C. Kocourek, Rte. 1, Box 90A, Whitelaw, Wis. 54247

Filed Jan. 28, 1987, Ser. No. 7,602
Int. Cl.[4] E02B *3/04, 3/06*
U.S. Cl. 405—31 **9 Claims**



1. A beach building block comprising a body having a planar bottom surface and a seaward-facing inclined front surface and a landward-facing upright back surface and with said inclined front surface and said upright back surface meeting together at a top portion and with said body having a triangular configuration in its side-view silhouette when viewed from the side-view directly along said surfaces, said body having only one inclined wave passageway extending therethrough from said inclined front surface adjacent said bottom surface to said upright back

surface adjacent and beneath said top portion, said inclined front surface being disposed and arranged to receive a wave and direct it upwardly and partly into said inclined passageway and partly above said top portion to thereby divide said wave into two wave parts in the flow of the wave beyond said upright back surface and for subsequent intersection of the two wave parts into each other to thereby reduce the force of the wave flow and thereby induce fallout of sand at the location adjacent said upright back surface, and said upright back surface including a solid upright wall portion extending from said bottom surface and upwardly to said passageway, and being free of any opening therein, for obstructing the flow of water in the seaward direction to thereby trap the sand suspended in the water and thereby build a beach at the locale to the back of said block in the landward-facing direction.

4,708,522

STORAGE COMPLEX FOR STORING RADIOACTIVE MATERIAL IN ROCK FORMATION

Sten G. A. Bergman, Stocksund; K. Ivar Sagefors, Stockholm, and Bengt A. Akesson, Frölunda, all of Sweden, assignors to Boliden Aktiebolag, Stockholm, Sweden

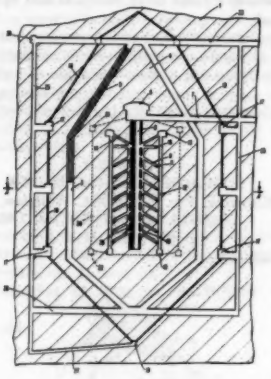
PCT No. PCT/SE85/00164, § 371 Date Nov. 25, 1985, § 102(e) Date Nov. 25, 1985, PCT Pub. No. WO85/04751, PCT Pub. Date Oct. 24, 1985

PCT Filed Apr. 9, 1985, Ser. No. 823,495

Claims priority, application Sweden, Apr. 10, 1984, 8401994

Int. Cl.[4] G21F *7/00*

U.S. Cl. 405—55 **13 Claims**



1. A structural complex for storing radioactive material in rock comprising:

(a) at least one body of solid material which forms a storage space for the radioactive material;

(b) a substantially vertical shaft arranged centrally in the body of solid material;

(c) a vertical annular shaft concentric with the central shaft:

(d) a plurality of vertical drifts located at a distance from a central axis of the central shaft, the vertical annular shaft and the vertical drifts being connected in the proximity of an upper and a lower part of the central shaft; and

(e) a plurality of strata mutually spaced in the vertical direction for storing radioactive waste, each stratum comprising a plurality of tubular bores, each bore having a central axis, the tubular bores extending radially from the center axis of the central shaft such that the center axes of the bores form an acute angle with the center axis of the central shaft.

4,708,523

ROCK CAVITY

Karl I. Sagefors, Öregrund, and Per G. Persson, Ytterbogdal, both of Sweden, assignors to Boliden Aktiebolag, Stockholm, Sweden

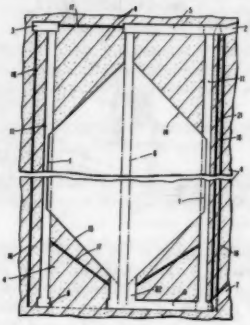
PCT No. PCT/SE85/00357, § 371 Date May 16, 1986, § 102(e) Date May 16, 1986, PCT Pub. No. WO86/01854, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 18, 1985, Ser. No. 871,398

Claims priority, application Sweden, Sep. 20, 1984, 8404728

Int. Cl.[4] B63G *5/00*

U.S. Cl. 405—55 **5 Claims**



1. A method of constructing a substantially vertical, cylindrical rock cavity having a conical top part, a bottom part and a vertical part having a cross-section in the shape of a polygon comprising:

(a) forming from a transport tunnel an upper circumferential chamber having a radially inwardly extending chamber at a first level;

(b) forming from a further transport tunnel a lower circumferential chamber having a radially inwardly extending chamber at a second level;

(c) forming a vertical central shaft to connect the upper and lower radially inwardly extending chambers;

(d) forming at least three vertical shafts;

(e) ring drilling horizontally from the vertical central shaft;

(f) drilling horizontally from the vertical shafts, said horizontal drill holes being located to form said cross-section in the shape of a polygon;

(g) drilling angled holes from the vertical shafts so as to form a conical roof or ceiling arch; and

(h) blasting upwards from below to form the vertical part of the rock cavity having the cross-section in the shape of a polygon wherein the upper and lower circumferential chambers have outer diameters greater than the substantially cylindrical part of the rock cavity, the first level is above the rock cavity, the second level is below the rock cavity and said at least three vertical shafts are formed at the periphery of the rock cavity.

4,708,524

REMOTE GUIDELINE CONNECTOR

Gregg A. Goris, Oxnard, Calif., assignor to Vetco Gray Inc, Houston, Tex.

Filed Sep. 20, 1985, Ser. No. 778,031

Int. Cl.[4] E21B *7/12*

U.S. Cl. 405—169 **4 Claims**

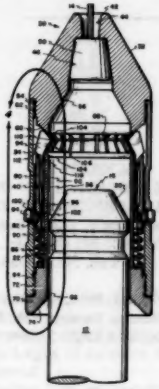
1. A guideline connector for connecting a guideline to a guideline post, comprising,

a body having means for retaining a guideline therein and having an inner diameter sufficient to receive a guide post top,

locking means including resiliently mounted axially and

radially moveable dogs which in an intial position are responsive to the contour of said guide post as the connector is inserted over the guide post to lock the said connector onto to said guidepost,

said locking means further including an inner sleeve, a collet, slideable over said inner sleeve and a moveable sleeve telescoped over part of said collet and together with said inner sleeve engages said collet to lock said collet onto said guide post, and



means for deactivating said locking means prior to withdrawal of said guide post thus allowing the connector to be withdrawn from said guide post,

said deactivating means including means for resetting said locking means automatically to said initial position,

said deactivating means including said movable sleeve which is locked against movement by said resettable means and which is unlocked to free said guide post of said collet and to set said resettable means in condition to automatically reset said collet after said connector has been withdrawn from said guide post.

4,708,525

MULTITERMINATORS FOR RISER PIPES

Pierre A. Beynet, Tulsa, Okla., and J. Thomas von Aschwege, Slidell, La., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 352,496, Feb. 25, 1982, Pat. No. 4,516,881. This application Feb. 14, 1985, Ser. No. 701,607

The portion of the term of this patent subsequent to May 14, 2002, has been disclaimed.

Int. Cl.[4] E21B *43/01*

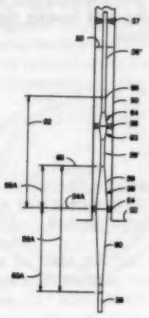
U.S. Cl. 405—195 **12 Claims**

1. A terminator assembly for use with a riser pipe used to anchor a floating structure, comprising:

a tubular sleeve for attachment to the floating structure and adapted for surrounding an upper portion of the riser pipe;

a first and a second terminator means connected to the riser pipe and spaced apart for providing a seleted lateral flexiblility in the riser pipe; and

a first bearing and a second bearing connected to the interior surface of the tubular sleeve for attachment with, respectively, the midsections of the first and second terminator means.



4,708,526

CONNECTION SYSTEM BETWEEN A MAIN BODY AND A SUPER-STRUCTURE

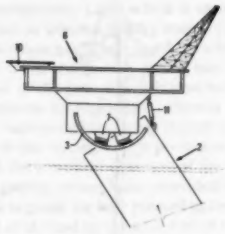
Hubert Berthet, and Noël Laugier, both of Arles, France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed May 16, 1984, Ser. No. 610,834

Claims priority, application France, May 18, 1983, 83-08208

Int. Cl.[4] E02B *17/00*

U.S. Cl. 405—202 **15 Claims**



1. A connection system between a floating main body and a superstructure adapted to be used in a sea environment, comprising means for moving said floating main body relative to said superstructure, and guide means cooperating with said moving means, wherein said moving means are inscribed on a cylindrical surface, and wherein said guide means and said moving means are adapted to allow at least a swinging movement of said main floating body relative to said superstructure.

4,708,527

PLASTIC PILE PROTECTOR AND METHOD OF COVERING A PILE WITH SAME

James A. Inhofe, Jr., Tecumseh, and Harold J. Evans, Perkins, both of Okla., assignors to Central Plastics Company, Shawnee, Okla.

Division of Ser. No. 524,559, Aug. 19, 1983. This application Mar. 4, 1987, Ser. No. 21,762

Int. Cl.[4] E02D *5/60*; E04B *2/00*

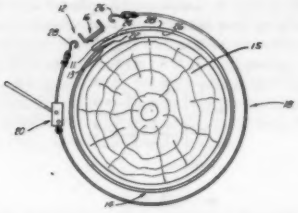
U.S. Cl. 405—216 **6 Claims**

1. An apparatus for covering a pile comprising:

a plastic sheet having an inner and outer surface and a first and second end, said plastic sheet having a shape for extending closely about a pile such that said first and

second ends extend and overlap along the longitudinal length of said pile;

an electrical resistance heating element disposed on said plastic sheet in a position such that when said first and second ends overlap said heating elment longitudinally extends therebetween;



means for heating said heating element such that said first and second ends are fused together and a bridging and sealing seam is formed between said first and second ends to hold and seal said plastic sheet about said pile.

4,708,528

PROCESS AND APPARATUS FOR STABILIZING FOUNDATIONS

Dondeville M. Rippe, Eureka, Mo., assignor to Magnum Piering, Inc., St. Louis, Mo.

Continuation-in-part of Ser. No. 803,740, Dec. 2, 1985, abandoned. This application Dec. 12, 1986, Ser. No. 940,853

Int. Cl.[4] E02D *5/00, 17/02*

U.S. Cl. 405—230 **24 Claims**

1. An apparatus for stabilizing a foundation which rests on an underlying surface material and includes an upright wall having a hole opening out of one of its faces, said apparatus comprising: a bracket including a sleeve having an axis and a single rod which is attached firmly to and projects generally radially from the sleeve, the rod being configured to fit snugly within the hole so as to locate the sleeve along that face of the wall out of which the hole opens, with the axis of the sleeve being presented generally vertically; a pier configured in cross-section to fit within and slide easily through the sleeve of the bracket and further being adapted to enter the surface material below the foundation; a jacking apparatus including a lift member and a jack connected to the lift member, the lift member being configured to engage the sleeve of the bracket such that an upwardly directed force may be applied to the sleeve in the direction of the axis of the sleeve, yet being detachable from the sleeve, the jack being located so as to bear against the pier when the pier is within the sleeve and to exert a downwardly directed force on the pier, with that force being resisted by an upwardly directed force applied to the sleeve at the lift member; and securing means for connecting the sleeve of the bracket to the pier so that the pier and the bracket will support the foundation when the jacking apparatus is detached from the bracket.

4,708,529

METHOD IN THE INSTALLATION OF PILES AND APPARATUS FOR CARRYING OUT THE METHOD

Edvin Lindell, Björkhagsvägen 6, 172 35 Sundbyberg, Sweden

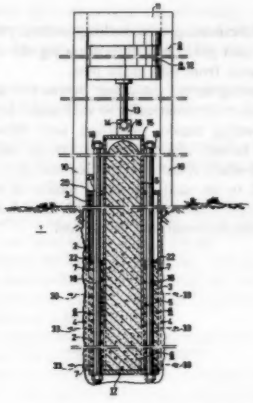
PCT No. PCT/SE86/00059, § 371 Date Oct. 24, 1986, § 102(e) Date Oct. 24, 1986, PCT Pub. No. WO86/04941, PCT Pub. Date Aug. 28, 1986

PCT Filed Feb. 13, 1986, Ser. No. 931,747

Claims priority, application Sweden, Feb. 25, 1985, 85009165

Int. Cl.[4] E02D *5/56*

U.S. Cl. 405—240 **19 Claims**



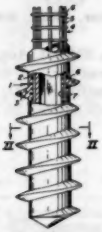
1. A method in the installation of piles, in which a pipe or like element is inserted into the ground, and through which pipe a flowing and solidifiable substance is introduced down into the ground so as to assist in supporting a pile when solidified, and in which said solidifiable substance is subjected to pressure in order to cause said substance to penetrate into the surrounding earth and/or displace the same, such as to create an anchorage for the pile, characterized by creating a cavity (6) in the proximity of and at least partially beneath the lower orifice (7) of the pipe (2), which pipe (2) constitutes an outer pipe (2); by applying pressure to a solidifiable substance of the aforesaid kind, preferably concrete, present in the cavity (6) by means of a raisable and lowerable body (5), which protrudes into the cavity and which passes beneath the bottom orifice (7) of the outer pipe (2) at least during a given part of the time over which said pressure is applied and which, when said pressure is applied, is moved forcibly downwards by means of a downwardly acting force in order to displace solidifiable substance present in the cavity (6).

4,708,530

CONCRETE FOUNDATION PILE AND DEVICE FOR DRIVING THE SAME INTO THE GROUND

Pieter Faber, No. 19, De Meute, 8312 BH Creil, Netherlands

Continuation of Ser. No. 605,172, Apr. 30, 1984, abandoned.
This application Oct. 14, 1986, Ser. No. 918,702
Claims priority, application Netherlands, May 3, 1983, 8301556
Int. Cl.[4] E02D 5/10, 5/14, 5/30, 7/30
U.S. Cl. 405—252 22 Claims



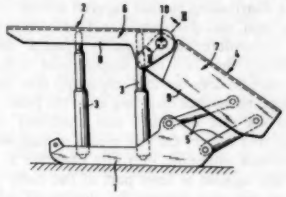
1. A concrete foundation pile comprising:
an elongated body;
a screw thread element extending helically over a considerable part of the length of an outer surface of said body from an end thereof;
and a cavity extending from an opposite end of said body;
said cavity having a non-circular, lengthwise substantially constant cross-section, at least in the part of the pile over which the screw thread element extends, and forming an internal engaging surface extending over the part of the pile over which the screw thread element extends, wherein said internal engaging surface is the wall of the cavity and wherein a rotational driving force is transferred over said internal engaging surface substantially along the full length of the pile over which the screw thread element extends.

4,708,531

PIVOT CONNECTIONS FOR USE WITH MINE ROOF SUPPORTS

Dieter Plenter, Recklinghausen, Fed. Rep. of Germany, assignor to Gewerkschaft Eisenhutte Westfalia GmbH, Lunen, Fed. Rep. of Germany

Filed Oct. 20, 1986, Ser. No. 920,962
Claims priority, application Fed. Rep. of Germany, Nov. 9, 1985, 3539800
Int. Cl.[4] E21D 23/04
U.S. Cl. 405—296 16 Claims



1. In a mine roof support comprising a roof-engaging structure, a floor-engaging structure, one or more hydraulic props disposed between the roof and floor engaging structures, a goaf shield, means pivotably interconnecting the goaf shield to the roof and floorengaging structures, gap seals in the form of L-shaped plates displaceably mounted on the goaf shield and the roof-engaging structures, the plates having side walls which overlap in the regions where the goaf shield and the roof-engaging structure are interconnected and a pivot connection between the overlapping side walls of the plates; the improvement comprising the pivot connection is composed of aligned apertures in the side walls, and a pair of complementary components engageable within the apertures from opposite sides, the components being provided with means defining a twist catch effected by relative rotation of the components to detachably lock the components together.

4,708,532

APPARATUS FOR STORING A CONCRETE FEEDING HOSE IN A ROCK BOLTING DEVICE

Jarmo Leppänen, Ylöjärvi, Finland, assignor to Oy Tampella Ab, Tampere, Finland

Filed Oct. 31, 1986, Ser. No. 925,567
Claims priority, application Finland, Nov. 7, 1985, 854382
Int. Cl.[4] E21D 20/02
U.S. Cl. 405—303 7 Claims

1. A device for storing a concrete feeding hose in a rock bolting device, comprising a reel which is mounted rotatably on a supporter and on which a feeding hose is coiled when the hose is withdrawn from a drill hole and from which the feeding hose is uncoiled when the hose is passed into the drill hole, whereby that end of the hose which is attached to the reel is connected to concrete feeding means, wherein
the reel being surrounded by a ring-shaped supporting wall against which the feeding hose is positioned when the reel is rotated in the uncoiling direction of the hose, and
an unrotative guiding means being provided beside the supporting wall to guide the hose pressed against the supporting wall out of the reel by the action of an expulsive force exerted on the hose due to the rotary movement of the reel.

4,708,533

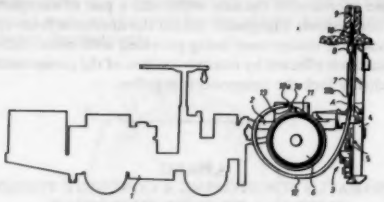
METHOD AND A DEVICE FOR GUIDING A CONCRETE FEEDING HOSE IN CONNECTION WITH THE GROUT FEED IN ROCK BOLTING

Jarmo Leppänen, Ylöjärvi, Finland, assignor to Oy Tampella AB, Tampere, Finland

Filed Oct. 23, 1986, Ser. No. 922,413
Claims priority, application Finland, Nov. 7, 1985, 854379
Int. Cl.[4] E21D 20/02
U.S. Cl. 405—303 21 Claims

5. A device for guiding a concrete feeding hose of in a rock bolting device, comprising a feeding beam and a drilling equipment thereof which are supported on a carrier and a drilling boom, a guide head which is supported on the feeding beam and which guides the concrete feeding hose into a drill hole, a feeder for passing the concrete feeding hose into the hole and for drawing it out of the hole, feeding means for feeding concrete into the hole through the feeding hose, and a feeding mechanism for pushing a bolt into the drill hole, said device

further comprising a flexible guiding means for the concrete feeding hose, said flexible guiding means being provided between the feeder of the concrete feeding hose and the guide head.



4,708,534

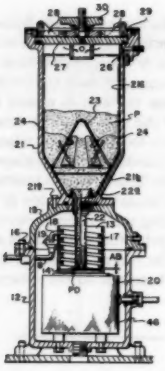
PARTICLE FEED DEVICE WITH RESERVE SUPPLY

Ben J. Gallant, Corpus Christi, Tex., assignor to Airsonics License Partnership, Corpus Christi, Tex.

Continuation-in-part of Ser. No. 727,199, Apr. 29, 1985, abandoned, Ser. No. 546,913, Oct. 31, 1983, abandoned, and Ser. No. 717,585, Mar. 29, 1985, Pat. No. 4,635,897, which is a continuation of Ser. No. 537,932, Sep. 30, 1983, abandoned, said Ser. No. 727,199, is a continuation of Ser. No. 526,653, Aug. 26, 1983, abandoned. This application Feb. 18, 1986, Ser. No. 830,686

Int. Cl.[4] B65G *53/40*

U.S. Cl. 406—75 **4 Claims**



1. Apparatus for feeding particulate material into a gaseous-stream comprising means defining a helical powder feed channel with its inlet in a lower portion thereof and inclined upwardly to an outlet, mechanism for vibrating said feed channel to effect upward feed of powder particles in the channel, a pressurized chamber having walls surrounding and spaced from the feed channel and mounted independently of the vibratory feed channel, a gas flow duct penetrating a wall of the pressurized chamber and having an upwardly open upwardly presented inlet orifice within the pressurized chamber, said gas flow duct and its upwardly presented inlet orifice being mounted independently of the vibratory feed channel, and a conduit mounted independently of said duct and rigidly connected with the vibratory feed channel and having a straight inlet end passage positioned in substantially tangential relation to the vibratory helical powder feed channel to receive particulate material from said channel and having an outlet opening positioned above the inlet orifice of said duct to deliver particulate material downwardly into the upwardly presented inlet orifice of said gas flow duct, the outlet opening of said conduit being vibratory with the feed channel independently of the inlet orifice of said gas flow duct, the inlet end of said flow duct comprising an upwardly flared funnel, and the delivery end of said conduit extending downwardly into said funnel in spaced relation to the walls thereof.

4,708,535

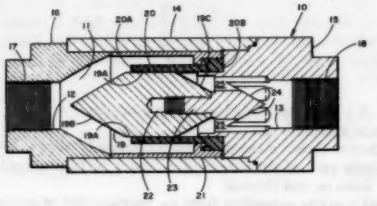
SEAL IN HIGH PRESSURE PNEUMATIC BOOSTER VALVE

James R. Steele, Stillwater, Minn., assignor to Dynamic Air Inc., St. Paul, Minn.

Continuation of Ser. No. 896,291, Aug. 11, 1986, abandoned, which is a continuation of Ser. No. 630,327, Jul. 12, 1987, abandoned. This application Jan. 27, 1987, Ser. No. 9,076

Int. Cl.[4] B65G *53/58*

U.S. Cl. 406—93 **5 Claims**



1. A high pressure pneumatic booster valve, comprising:

a housing;

an elongated generally cylindrical chamber within said housing, said chamber having an inlet at one end through which all received pressurized fluid enters longitudinally directly into said chamber and an outlet at the other end through which pressurized fluid exits said chamber;

an imperforate plug member located within said chamber, said plug member having a cylindrical section with its axis coaxial with the chamber axis and an uninterrupted outer cylindrical surface spaced from the chamber wall and a surface area attached to the inlet end of said cylindrical surface tapered inward toward the chamber inlet;

an elongated annular resilient seal means having an axial through passageway of uniform diameter and a wall of uniform thickness attached to one end to said housing around said chamber inlet for confining all of the received pressurized fluid within said seal means passageway and directing it longitudinally around the outside of said plug member;

means for uniformly distributing the fluid at said inlet comprising a distributing surface tapered inward toward said chamber inlet, said distributing surface leading to a plurality of circumferentially equally spaced passageways which direct the fluid into engagement with said plug tapered surface area without impacting said seal means;

said plug tapered surface directing all of the pressurized fluid received via said inlet and said uniformly distributing means to first impact the seal means passageway;

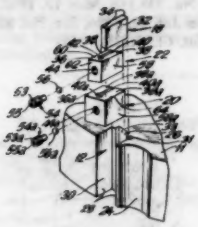
said seal means extending into said chamber to resiliently snugly seat against at least part of the outer cylindrical surface of said plug member for closing off the longitudinal fluid flow from said chamber inlet through said chamber to said chamber outlet until the force of the fluid pressure impacting the seal means passageway exceeds the combined fluid pressure at the outlet and the resilient force holding the seal means seated against the outer cylindrical surface of said plug member to allow fluid flow from the inlet around the outside of the plug member to the outlet.

4,708,536

EXPANDABLE WEDGE ASSEMBLY FOR RELEASABLY SECURING AN INSERT IN A CUTTING TOOL

Jack O. Sullivan, Knoxville, Tenn., assignor to General Electric Company, Detroit, Mich.

Continuation of Ser. No. 689,383, Jan. 7, 1985, abandoned. This application Nov. 12, 1986, Ser. No. 930,080
Int. Cl.[4] B23C 5/22
U.S. Cl. 407—41 6 Claims



1. A cutting tool, comprising:

a body having at least one pocket therein in the form of an essentially vertical slot extending the length of said body and having an inner and opposing side walls and an outer opening coextensive with the length and breadth of said walls and wherein said side walls are dovetailed so as to be closer together at said outer opening than at said inner wall;

an indexable cutting insert in said pocket and along one of said sidewalls, wherein said insert is in the form of a flat wafer having parallel sides and peripheral cutting edges essentially normal to said sides;

an expandable wedge assembly normally having parallel sidewalls and a vertical slot therethrough extending the length of said wedge assembly to form a first pair of flexible legs for inserting into said pocket between said wafer and the other sidewall of said pocket and a first bore extending horizontally into said wedge having a first outer accessible threaded portion and an adjacent inwardly directed first tapered portion extending between said first pair of legs;

an expandable locator for seating and positioning said indexable cutting insert, said locator having a second pair of flexible legs insertable in the pocket between the opposing walls of the pocket, an upper surface for seating the insert, and a second bore extending into said locator having a second outer threaded portion and an adjacent inwardly directed second tapered portion extending between said second pair of flexible legs;

screw means in said first threaded portion of said first bore;

expanding means in said first tapered portion of said first bore adapted to cooperate with said screw means to flex said first pair of legs laterally outwardly against a sidewall of said pocket and said insert as said screw means is threaded into said first bore for securing said insert against the other sidewall of the pocket, and to unflex said first pair of legs as said screw means is threaded from said first bore for releasing the insert for indexing or replacement;

screw means in said second threaded portion of said second bore; and

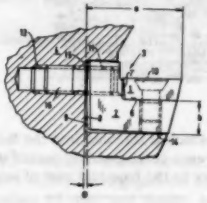
expanding means in said second tapered portion of said second bore adapted to cooperate with said screw means to flex said second pair of legs laterally outwardly against the opposing walls of the pocket as said screw means is threaded into said second bore for securing said locator within the pocket, and to unflex said second pair of legs as said screw means is threaded from said second bore for releasing and adjusting said locator.

4,708,537

METAL CUTTING TOOL

Shmuel Elka, Nahariya, and Amir Satran, Kiryat Bialik, both of Israel, assignors to Iscar Ltd., Nahariya, Israel

Filed Aug. 15, 1986, Ser. No. 897,548
Claims priority, application Israel, Aug. 28, 1985, 76241
Int. Cl.[4] B23C 5/22
U.S. Cl. 407—46 3 Claims



1. In a metal cutting tool having an exchangeable cutting insert mounted on a replaceable cartridge seat releasably fitted in a tool holder of the cutting tool, the improvement wherein said cartridge seat comprises a body portion with a receiving pocket formed therein, said body portion having an axially directed external surface and a substantially planar rear surface, said receiving pocket being formed with a substantially planar insert receiving surface; said tool holder being formed with an insert receiving cavity having an axially directed internal surface adapted to receive said body portion and a substantially planar end surface adapted to abut said rear surface; one of said axially directed surfaces being substantially cylindrical and the other being formed with a first, axially directed protrusion located in a plane of symmetry of said body portion substantially normal to the insert receiving surface and located on one side of said insert receiving surface and with two further, axially directed protrusions located symmetrically with respect to said plane of symmetry and located on opposite sides of said insert receiving surface; a screw coupling bore formed eccentrically in said body portion so as to be aligned with a corresponding screw coupling bore formed in the tool holder and opening out into said end surface, said rear and end surfaces defining between them an acute angle which extends from a region of abutment of said rear and end surface; the arrangement being such that upon the coupling together of said cartridge seat in said receiving pocket said body portion pivots about its region of abutment so as to be clamped by said protrusions.

4,708,538

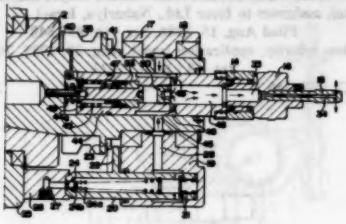
TAPPING HEAD

Haruaki Kubo, and Yoshiyuki Kamanaka, both of Osaka, Japan, assignors to Daishowa Seiki Co., Ltd., Osaka, Japan

Filed Jun. 25, 1985, Ser. No. 748,679
Claims priority, application Japan, Jun. 29, 1984, 59-99420[U]
Int. Cl.[4] B23B 47/24, 51/06
U.S. Cl. 408—59 4 Claims

1. A tapper comprising a tapper proper possessing a shank part on a base end part side thereof, a shaft to be driven which, although said shaft to be driven is rotated integrally with said tapper proper, is built in such that it can be axially freely removed independently of said tapper proper, as well as being supported for being under a floating state by a compression spring and a tension spring which energize resilient forces in directions opposite to each other, characterized in that said tapper proper is provided with a passage for receiving oil flowing from the outside, the shaft to be driven is provided with a hollow section for passing the oil therethrough, which feeds the oil into a tap, an oil hole through which the passage for receiving the oil communicates with the hollow section for passing the oil therethrough, is made on the shaft to be driven,

and an end wall of the hollow section for passing the oil therethrough is provided on the shaft to be driven and the end wall



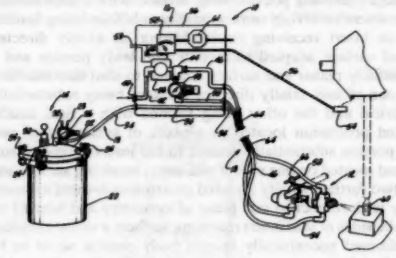
comprises a plug which is screwed into the hollow section of the shaft to be driven, a corresponding part of which is located on a position nearer to the base end part of said oil hole.

4,708,539

TAP LUBRICATING SYSTEM

James A. Threadgill, Rolling Meadows, Ill., assignor to Master Chemical Corporation, St. Perrysburg, Ohio

Filed Nov. 22, 1985, Ser. No. 800,687
Int. Cl.[4] B23B *51/06*
U.S. Cl. 408—61 **7 Claims**



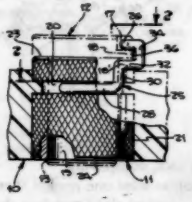
1. In a machine tool for performing a machining operation on a work piece at a work site comprising, in combination:
- a tool driven by said machine tool for machining said work piece;
- a tapping fluid applicator system including the following:
- a normally closed dispensing nozzle directed toward said tool at said work site;
- a supply tank for containing said tapping fluid;
- means for supplying tapping fluid from said tank to said nozzle;
- a suspension air pressure regulator;
- control circuit means remote from said work site responsive to a start command for generating a control signal for a preset time period;
- means responsive to said control signal for supplying suspension air through said regulator to said nozzle and for simultaneously opening said normally closed nozzle including means for supplying actuating air to said nozzle for opening said nozzle to emit an air suspension stream of tapping fluid droplets therefrom; and
- wherein said control circuit means comprises:
- an electrically operated actuating valve controlling the supply of actuating air to said nozzle;
- a timing means which determines said preset time interval;
- means responsive to said control signal for actuating said electrically operated valve;
- whereby during said control signal said valve is opened, supplying actuating air to said nozzle and opening the nozzle thereby commencing the emission of said suspension of tapping fluid from said nozzle for said preset time period determined by said timing means and thereafter closing said valve cutting off the supply of actuating air to said nozzle and the emission of said suspension from said nozzle.

4,708,540

WIRE LOCK LINER

Thomas Heimbigner, Bellflower, and Gary Tsui, Rosemead, both of Calif., assignors to CBC Industries, Inc., Commerce, Calif.

Continuation of Ser. No. 733,118, May 13, 1985, abandoned. This application Jul. 22, 1986, Ser. No. 889,287
Int. Cl.[4] B23B *49/02*
U.S. Cl. 408—72 B **4 Claims**



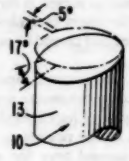
1. A liner bushing component for a slip renewable guide bushing component wherein the guide bushing component is provided with an interlocking projection, said liner bushing component comprising a substantially cylindrical sleeve having an interior wall forming a cylindrical bore for reception of the guide bushing component, an exterior wall and opposite end edges, a circumferentially extending recess means in the exterior wall and a pair of axially disposed slot means in the exterior wall, a separate interlock rod member for the cylindrical sleeve comprising a shoulder element spaced endwardly outward from one of said end edges, attachment means with separate attachment elements disposed in said circumferentially extending recess means on respective opposite sides, and an interconnecting member between each of said attachment elements and respective opposite sides of said shoulder element, said interconnecting member being lodged in said axially disposed slot means, said shoulder element comprising a first bent configuration intermediate opposite ends of the interlock rod member, said attachment elements comprising second bent configurations of said interlock rod member, and said interconnecting members each comprising third bent configurations of said interlock rod member, said interconnecting members being of functional yieldability in an axial direction.

4,708,541

VALVE SEAT CUTTING TOOL

Willie H. Edgerton, Florence, S.C., assignor to Wilbert Ouzts, Florence, S.C.

Filed Mar. 10, 1986, Ser. No. 837,674
Int. Cl.[4] B23B *41/00*
U.S. Cl. 408—83.5 **1 Claim**



1. A valve seat cutting tool, for repairing valve seats of hydraulic jacks, comprising:

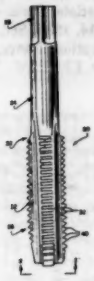
a cylindrical shank of hardened steel having at a lower end a forward cutting face and a side cutting face lying in the same plane forming a single surface and the angle of said forward cutting face and the angle of said side cutting face are cut at right angles to one another which said forward cutting face is beveled from back to front at a 17 degree angle and which said side cutting face is beveled increasing from the left side to the right side of said cylindrical shank at a 5 degree angle, both angles with respect to the horizontal plane of said cylindrical shank, when viewed facing said forward cutting face of said cylindrical shank in a vertical position, the upper end of said cylindrical shank being suitable for engagement by a conventional drilling mechanism.

4,708,542

THREADING TAP

Diso J. Emanuelli, Greenfield, Mass., assignor to Greenfield Industries, Inc., Augusta, Ga.

Filed Apr. 19, 1985, Ser. No. 724,860
Int. Cl.[4] B23G 5/06
U.S. Cl. 408—144 **3 Claims**



1. A straight fluted tap for use in cutting threads in a workpiece, said tap comprising a body having a shank portion and a thread cutting portion, said thread cutting portion of said body including three flutes having teeth for cutting material from a workpiece to make a screw thread, and a coating of titanium nitride disposed over the outer side surface of siad thead cutting portion of the body of said tap, said coating having a Rockwell C hardness of at least 70, said thread cutting portion of the body of said tap having a Rockwell C surface hardness of at least 65 to enable the thread cutting portion to provide a rigid support for the titanium nitride coating, at least some of the teeth on the thread cutting portion of said tap having a chordal hook angle in the range of a negative 9 to neative 1 degrees.

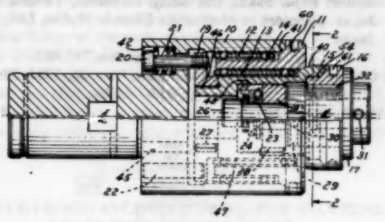
4,708,543

COARSE RADIAL ADJUSTMENT BORING QUILL

Lawrence Plutschuck, Warren, and Carl E. Hunt, Milford, both of Mich., assignors to GTE Valeron Corporation, Danvers, Mass.

Filed Apr. 5, 1985, Ser. No. 720,570
Int. Cl.[4] B23B 29/034
U.S. Cl. 408—151 **12 Claims**

1. Radially adjustable boring quill comprising bushing means, eccentric adjustment ring means having inner and outer surfaces of revolution about parallel offset axes, means for assembling said ring and bushing means for relative adjustment rotation about said eccentric adjustment ring outer surface axis of revolution, said means for assembling including tool holder means engaging said inner surface of revolution at diametrically opposed contacts, linear guide means for said tool holder means confining its movement to a linear radial path during adjustment rotation of said adjustment ring while the axis of said inner surface of revolution moves in a circular arcuate path, and resilient means yieldable to said adjustment rotation



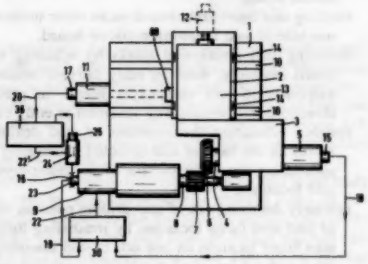
for compressively loading said tool holder, ring and bushing means in operative adjustable engagement sufficiently to retain an adjusted position of said tool holder means during tool operation.

4,708,544

MACHINE TOOL CONTROLLER

Ingo Faulstich, Ludwigsburg, and Dieter Ulbrich, Abstadt, both of Fed. Rep. of Germany, assignors to Hermann Pfauter GmbH & Co., Ludwigsburg, Fed. Rep. of Germany

Filed May 29, 1986, Ser. No. 867,914
Claims priority, application Fed. Rep. of Germany, May 29, 1985, 3519132
Int. Cl.[4] B23F 5/00
U.S. Cl. 409—12 **25 Claims**



1. A method, comprising:

moving a main guide element of a machine tool to produce a first basic movement;

moving a reference element of said machine tool to execute a second basic movement at a predetermined ratio to the movement of said main guide element;

deriving pulse sequences from said main guide element and said reference element, said pulse sequences having the same frequency and having a phase relationship indicative of the relative positions of said main guide element and said reference element;

superimposing on at least one of said pulse sequences a phase shift indicative of an additional movement to be carried out by said reference element at a speed which is slow relative to the speed of said basic movements in order to produce a phase shifted pulse sequence;

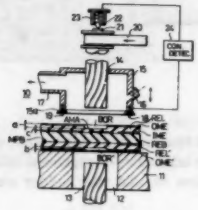
comparing the phase of the phase shifted pulse sequence with the pulse sequence not having a superimposed phase shift to produce a phase shift resolution signal which is indicative of a movement which is finer than the movement indicated by the distance between adjacent pulses of said derived pulse sequences.

4,708,545

METHOD FOR DRILLING REFERENCE HOLES IN MULTI-LAYER PRINTED WIRING BOARD ASSEMBLY

Toshinori Fujii, Sakai, and Shinji Okamoto, Yawata, both of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Nov. 14, 1985, Ser. No. 797,983
Claims priority, application Japan, Nov. 26, 1984, 59-249203
Int. Cl.[4] B23C 3/00
U.S. Cl. 409—131 **7 Claims**



1. A method for drilling reference holes in a multi-layer printed wiring board assembly having an inner-layer circuit board with a circuit pattern thereon, and an outer-layer board, comprising the steps of:

providing drilling position marks for said reference holes on said inner-layer circuit board,

providing positioning marks made of a conductive foil at prescribed related positions to said drilling position marks and in the vicinity of said circuit pattern of said inner-layer circuit board,

stacking said outer-layer board on an outer surface of at least one side of said inner-layer circuit board,

detceting said positioning marks by scanning said wiring board assembly, with an eddy current sensor mounted exteriorly of said outer-layer board, in predetermined directions and sensing any variation in eddy current loss,

roughly estimating the locations of said drilling position marks on the basis of said detected positioning marks and spot-facing the outer surface of the outer-layer board at said locations,

precisely detecting one of said drilling position marks at one of said spot-faced locations by irradiating light onto said spot-faced location on one side of said assembly, monitoring a lighted image of said drilling position mark at said spot-faced location on the other side of said assembly, and indexing the center of said drilling position mark in said monitored image thereof, and

drilling reference holes through the stacked boards at said drilling position marks.

4,708,546

ROTATING CUTTING TOOL HOLDER FOR BIT GENERATION

Kenneth G. Noggle, W. Bloomfield, Mich., assignor to GTE Valeron Corporation, Troy, Mich.

Filed Dec. 24, 1986, Ser. No. 946,230
Int. Cl.[4] B23C 3/05, 5/16
U.S. Cl. 409—200 **7 Claims**

1. A rotary cutting tool comprising:

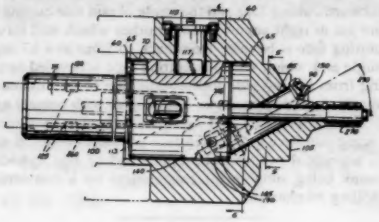
a housing rotatable about an axis having a first longitudinal recess concentric with said axis and guide means therein,

a second recess intersecting said first recess and extending outwardly therefrom,

an actuating bar longitudinally mounted in said first recess, said bar having forwardly disposed coupling means,

a tool shank rotatably mounted in said second recess having forwardly disposed cutting means and rearwardly disposed engaging means,

means for retaining said rotatable shank in said second recess to prevent premature removal,



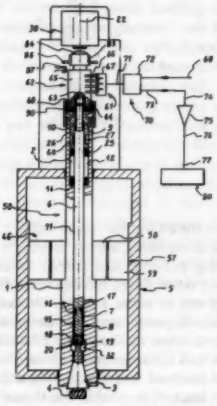
said engaging means mated with said coupling means to communicate axial actuating bar movement to said shank for radial generation of said cutting means.

4,708,547

SAFETY TOOL-HOLDER FOR MACHINE-TOOLS

Claude Baron, Couëron, France, assignor to Societe Nationale Industrielle et Aerospatiale, Paris, France

Filed Oct. 14, 1986, Ser. No. 918,394
Claims priority, application France, Oct. 14, 1985, 85 15201
Int. Cl.[4] B23C 7/00
U.S. Cl. 409—233 **10 Claims**



1. Safety tool-holder for machine-tool, of the type comprising:

a quill in which is axially cut a through-opening, said quill being mounted in a body integral with the machine-tool;

a rod placed in said axial opening of the quill, a first end of said rod comprising gripping means adapted to grip a tool head, the second end of said rod having a threaded portion, and said rod being axially movable with respect to said quill between a working position in which the tool is locked, and a rest position in which the tool is unlocked;

axial elastic return movement means, resting first against the quill and second, against a nut screwed on the threaded portion of said rod and making it possible to keep said rod in its working position, tool-holder wherein means are provided for continuously monitoring the rod in its working position, said means being composed of at least one elastic deformation sensor disposed on said nut, electric supply and transmission means for said sensor, means for processing the signals produced by said sensor, and means for displaying said signals, in order to detect the variation

of the elastic deformation of the nut under the action of the elastic return means.

4,708,548

RELEASABLE COUPLING

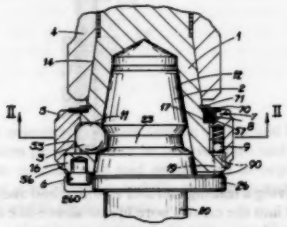
Peter Taylor, 55, Rees Drive, Finham, Coventry, West Midlands, and Roger B. Griffin, 258 Birmingham Road, Allesley Village, Coventry, West Midlands, both of United Kingdom

Continuation of Ser. No. 561,457, Dec. 14, 1983, abandoned. This application Dec. 16, 1985, Ser. No. 808,387

Claims priority, application United Kingdom, Dec. 15, 1982, 82-35739; Apr. 16, 1983, 83-10351

Int. Cl.[4] B23B *31/06, 31/10*

U.S. Cl. 409—234 **3 Claims**



1. A releasable coupling especially for tool mounting purposes which comprises

(a) a socket member having a forward end, an axial socket therein and radial bore formation therethrough communicating with said axial socket, said socket member having an outwardly directed radial flange thereabout at its forward end, which flange is externally formed for direct positive dogged rotary driving engagement with a cooperating outwardly directed flange of a male member;

(b) a male member axially receivable by said axial socket of the socket member so as to have a non-locking fit therein, said male member having an outwardly directly radial flange thereabout which is externally formed for direct positive dogged rotary driving engagement with said outwardly directed radial flange of said socket member when the male member is fully inserted in said axial socket of said socket member, which driving engagement is disengaged on withdrawal of the male member;

(c) retaining element means radially movable within the radial bore formation of the socket member for engagement with cooperating recessed formation in the male member;

(d) a collar rotatable about the socket member but constrained against axial movement on said socket member between retaining means thereon and the rear of said outwardly directed radial flange on said socket member, said collar having internal cam formation arranged, on appropriate turning movement of the collar relative to the socket member, to act on the retaining element means for either thrusting the latter into retentive engagement with the cooperating recessed formation of the male member for axial retention thereof in the socket of the socket member or, conversely, for permitting release of said engagement and enabling axial withdrawal of the male member from the socket;

(e) spring-loaded means acting between the socket member and collar for urging the latter for rotation in a direction to thrust the retaining element means into retentive engagement with the male member; and

(f) spring-loaded retaining means acting between the collar and the socket member for releasably retaining the spring-loaded collar in a release position relative to the socket member so as to permit outward radial movement of the retaining element means from the cooperating formation of the male member and axial withdrawal of the latter from the socket, said spring-loaded retaining means comprising a spring-loaded member carried by the collar in an axially parallel manner and directly engageable with a cooperating axially parallel bore through the outwardly directed radial flange about the socket member for retaining the collar in the release position, said bore containing a plunger which protrudes forwardly from said flange for contact and axial movement by the outwardly directed radial flange of the male member on full axial insertion of the latter into the socket of the socket member in order to lift the spring-loaded member from engagement with the bore and thus permit spring-loaded rotation of the collar about the socket member from the release position for obtaining automatic axial retention of the male member therein.

4,708,549

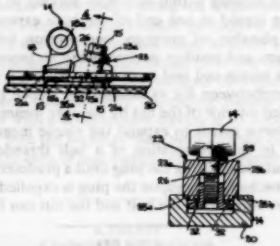
RATTLE-PROOF ANCHOR FITTING FOR SECURING LOADS TO RETAINER TRACK

Richard H. Jensen, Torrance, Calif., assignor to Anera Corporation, Hawthorne, Calif.

Continuation of Ser. No. 729,486, May 1, 1986, abandoned. This application Sep. 11, 1986, Ser. No. 906,679

Int. Cl.[4] B60P *7/08;* **B60N** *1/08*

U.S. Cl. 410—105 **5 Claims**



1. An anchor fitting for securing a load to a slotted retainer track (30), said track (30) having notched portions (30*a*) separated by narrow neck portions (30*b*), said fitting comprising:

a main body portion (14) having opposite sides and base pad means (15) with a substantially flat bottom surface (15) and shoulders (15*a*) extending therefrom in a direction substantially parallel to said surface,

a plunger-clamp member (23) supported on said main body portion (14) for movement relative thereto along an axis substantially normal to the flat bottom surface (15) of the main body portion (14), said plunger-clamp member (23) having a pair of opposing arms, (23*a*, 23*b*) which overlap the opposite sides of said main body portion (14), a projection (32) having a curved surface (32*a*) extending downwardly from each of said arms 23*a*, 23*b* towards the base pad means (15), said projection (32*a*) fitting in the notched portions (30*a*) of the track (30) in mating engagement therewith, and a shoulder formed on each of said arms (23*a*, 23*b*) directly above each of said projections (32),

screw means (25) slidably fitted through said plunger-clamp member (23) in rotatable relationship thereto and threadably engaging said body portion (14) for slidably positioning the plunger-clamp member (23) along said axis, and

means (26) for restraining said screw means (25) against any substantial longitudinal movement relative to the plunger-clamp member (23),

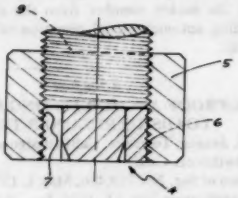
said screw means (25) being rotated in a first direction to drive the plunger-clamp member (23) along said axis to a first predetermined position whereat the plunger-clamp member projections (32) form a plunger which is seated in one of the track notched portions (30*a*) and the shoulders (35*a*, 35*b*) formed on the arms (23*a*, 23*b*) and the shoulders (15*a*) of the base pad means (15) are in firm abutment against the track (30) to secure the fitting to the track (30), said screw means (25) being rotated in a direction opposite said first direction to drive the plunger-clamp member (23) along said axis to a second predetermined position whereat the fitting can be removed from the track (30).

4,708,550

RESISTANCE BETWEEN NUT AND BOLT

Richard J. W. Hamilton, Adamstown Heights, Australia, assignor to The Titan Manufacturing Co. Pty. Ltd., Mayfield, Australia

Filed Nov. 12, 1981, Ser. No. 320,796
Claims priority, application Australia, Nov. 18, 1980, PE6531
Int. Cl.[4] F16B *31/00, 33/04*
U.S. Cl. 411—3 **10 Claims**



1. A nut having a threaded bore extending therethrough, said threaded bore having a single thread therein, a plug at least partly located within said bore leaving at least one full turn of the thread at one end of the bore exposed, said plug having a plurality of portions, one portion being an outer sleeve means and another portion being an inner core means, said sleeve means and said core means having a wedge action profile therebetween for expanding the sleeve means against the threaded interior of the nut by the core means being driven into the sleeve means to expand the sleeve means to provide resistance to relative rotation of a bolt threadedly engaged with the nut and abutting the plug until a predetermined torque has been reached, whereupon the plug is expelled from the nut and relative rotation of the bolt and the nut can further occur.

4,708,551

EXPANSION DOWEL ASSEMBLY

Hanno Richter, Unterhaching; Helmut Mirsberger; Raimer Uhlig, both of Munich; Manfred Haage, Waldachtal, and Philipp Uebel, Prien, all of Fed. Rep. of Germany, assignors to Hilti Aktiengesellschaft

Filed Jan. 8, 1985, Ser. No. 689,664
Claims priority, application Fed. Rep. of Germany, Jan. 9, 1984, 3400474
Int. Cl.[4] F16B *13/06, 13/00*
U.S. Cl. 411—32 **4 Claims**

1. Expansion dowel assembly for use in the attachment of facing plates to and in spaced relation with a structure, comprising a monolithic axially extending sleeve-like member having a leading end to be inserted into the structure and a trailing end to be located at the surface of the facing plate facing outwardly from the structure, said sleeve-like member forming a central bore extending from the trailing end toward the leading end, said sleeve-like member comprising an axially extending expansion section extending from the leading end toward the trailing end and arranged to be inserted into a borehole in the structure, said central bore extending axially into said expansion section to at least adjacent the leading end of said sleeve-like member, and an axially extending collar section extending from the trailing end of said expansion to the trailing end of said sleeve-like member, said collar section including a bearing spaced axially between the trailing end of said expansion section and the trailing end of said sleeve-like member and arranged to be inserted through an opening in the facing plate and forming a bearing surface extending transversely of the axis of said sleeve-like member and arranged to bear against the surface of the facing plate directed toward the structure, an abutment at the trailing end of said monolithic sleeve-like member and arranged to bear against the surface of the facing plate directed away from the structure, said collar section further including an axially extending part disposed between and interconnecting said bearing and said abutment with at least an axially extending portion of said part being axially collapsible for adapting said part to the thickness dimension of the facing plate extending between the oppositely directed surfaces thereof, said bearing on said collar section is displaceable radially inwardly relative to said collar section axis along with the adjacent portion of said part extending between said bearing and said abutment so that said bearing can be displaced radially inwardly for passage through the opening in the facing plate, and an axially extending expansion

element having a leading end and a trailing end and arranged to be inserted into the central bore in said sleeve-like member and means on said expansion element intermediate the leading and trailing ends thereof for engaging the surface of said central bore in the axially extending region of said part for collapsing said axially extending portion, said part of said collar section located between said bearing and said abutment has at least an axially extending portion thereof of a smaller thickness relative to the wall thickness of the remaining said collar section, said part of said collar section located between said abutment and said bearing has a step-like shoulder formed in the inner surface of said part in axially spaced relation to said abutment and said bearing surface and facing toward said abutment, said means on said expansion element comprises a correspondingly shaped stepped shoulder thereon arranged to contact said step-like shoulder in said part for axially collapsing said part as said expansion element is driven through said central bore into said expansion section.

4,708,552

EXPANSIBLE MOUNTING ASSEMBLY

Rafael T. Bustos, Alpharetta, and William B. Taylor, Chamblee, both of Ga., assignors to Clairson International, Ocala, Fla.

Filed Sep. 12, 1984, Ser. No. 649,818
Int. Cl.[4] F16B *13/06*
U.S. Cl. 411—60 **12 Claims**

1. A mounting assembly for mounting an object to a wall having an outer surface formed of plaster wallboard comprising:

a molded plastic bracket having a hollow barrel formed therein and having means formed thereon for supporting an object from said bracket, said bracket having a flat rear surface adapted to be placed against a flat vertical surface of plaster wallboard for mounting thereto;

a molded plastic anchor including a stem section, a head section, and a pointed end section, said head section being located at one end of said stem section, and said pointed end section being located at the opposite end of said stem section from said head section;

an axial bore extending through said head section and through at least a portion of said stem section;

an external peripheral surface on said said section of said anchor, said external peripheral surface having annular ribs formed thereon;

slot means formed in said stem section of said anchor for defining two opposed stem members, said slot means extending along a major portion of the length of said stem section between a point adjacent said axial bore and a point adjacent said pointed end section, said two opposed members each having a free end adjacent said pointed end

section, said anchor including means for releasably joining each of said free ends;

said molded plastic anchor being adapted to be inserted through said hollow barrel and to be driven into the plaster wallboard located in juxtaposition to said rear surface of said bracket;

means for orienting said stem section within said barrel; and

an expansion pin adapted to be inserted into said axial bore and into contact with said projections to urge said two opposed stem members radially outwardly and to release said releasable joining means.

4,708,553

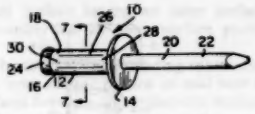
LARGE SECONDARY HEAD RIVET

Joseph J. Braychak, Bethany, and John P. Casey, Sr., Prospect, both of Conn., assignors to USM Corporation, Farmington, Conn.

Continuation-in-part of Ser. No. 537,082, Sep. 29, 1983, abandoned. This application Sep. 16, 1985, Ser. No. 776,290

Int. Cl.[4] F16B *13/04*

U.S. Cl. 411—34 **3 Claims**



1. A blind rivet of the type adapted to be inserted into the opening in a workpiece and having a flange at one end and adapted to be deformed by the head of a mandrel at the opposite end when the mandrel is pulled:

a. an elongated rivet body carrying a flange on one end and being open at the opposite end;

b. said rivet body having a plurality of longitudinally extending weakened areas between the flange and the open end;

c. said weakened areas extend through said rivet body to form slots therein and are circumferentially equally spaced about the rivet body and each said weakened areas terminate substantially spaced from said flange and said open end so there are continuous solid areas of the rivet body adjacent said flange and said open end;

d. said rivet body having longitudinally extending solid portions between said weakened areas that have abutting line contact throughout their longitudinal extent at said weakened areas;

e. said weakened areas being adapted to separate when the rivet body is deformed to form from said solid portions a plurality of outwardly extending petals that form an enlarged secondary head on the rivet;

f. said weakened areas only of said rivet body being adapted to be deformed when the mandrel is pulled so that minimal lateral forces would be exerted on an opening in a workpiece and the deformation of said rivet body would be localized;

g. when the rivet is deformed, the solid area of said open end being adapted to retain the mandrel head and being received against the solid area adjacent said flange, and closer to said flange than the termination of said weakened area to seal the rivet within the workpiece opening.

4,708,554

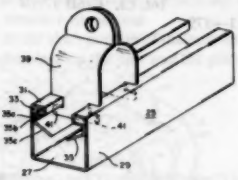
STRUT

William A. Howard, 710 El Capitan Dr., Danville, Calif. 94526

Filed Apr. 8, 1985, Ser. No. 721,221

Int. Cl.[4] F16B *37/00*

U.S. Cl. 411—84 **12 Claims**



1. An elongated strut having inwardly depending flanges disposed generally continuously along the length of the slot of said strut, said flanges being formed to receive and secure fittings inserted into the slot of said strut, wherein portions of said flanges depend from the lips of said strut and form opposing shelves at the top of the strut proximate the continuous slot of the strut and said inwardly depending flanges define an interior cavity with a cross-section having at its widest point a width greater than the width of the continuous slot of said strut and wherein the ends of said flanges project generally towards each other.

4,708,555

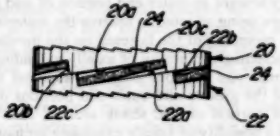
LOCKING FASTENER

Sydney L. Terry, 23409 Jefferson Ave., St. Clair Shores, Mich. 48080

Filed Dec. 19, 1985, Ser. No. 811,113

Int. Cl.[4] F16B *39/24*

U.S. Cl. 411—149 **11 Claims**



1. An annular locking fastener adapted to be mounted on an elongated threaded member, said locking fastener comprising:

(A) a first portion;

(B) a second portion movable relative to said first portion;

(C) confronting coacting parallel first and second ramp surfaces on said first and second portions, respectively, inclined at a circumferential angle of at least 7° and movable into sliding wedging contact with each other in response to relative movement between said portions in a first, tightening direction to cause said first ramp surface to move slidably down said second ramp surface to decrease the overall axial height of said fastener and operative in response to relative movement between said portions in the opposite, loosening direction to cause said first ramp surface to move slidably up said second ramp surface to increase said overall height; and

(D) spring means yieldably resisting relative movement of said portions in said first, tightening direction and operative in response to such tightening movement to store energy in said fastener biasing said portions for movement in said opposite, loosening direction to urge said first ramp

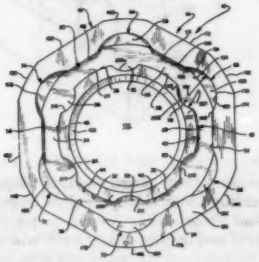
surface to move slidably up said second ramp surface to increase the overall height of the fastener.

4,708,556

FASTENER ATTACHED TO SHEET METAL

W. Richard Pamer, and James A. Zils, both of Parma, Ohio, assignors to Russell, Burdsall & Ward Corporation, Brooklyn Heights, Ohio

Filed May 14, 1985, Ser. No. 733,978
Int. Cl.[4] F16B *37/04*
U.S. Cl. 411—179 10 Claims



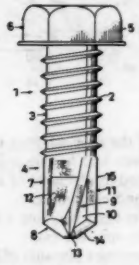
1. A fastener adapted to be received in a member and held against axial and rotational movement relative to the member by interacton between the member and said fastener, said fastener comprising a head section having a central axis, a shank section extending axially outwardly from said head section and having a central axis conincident with the central axis of said head section, said head and shank sections including surface means for defining an internal thread convolution extending axially through said head and shank sections, said head section including a rim which extends axially along said shank section, said rim of said head section and said shank section cooperating to at least partially define a generally annular groove which extends around said shank section and has a generally annular bottom surface which faces axially outwardly toward an outer end portion of said shank section, said groove being adapted to receive the material of the member upon mounting of the fastener on the member, said shank section including a plurality of axially extending indentations having inner end portions disposed adjacent to the bottom surface of the groove and outer end portions disposed in the outer end portion of said shank section, said shank section including a plurality of axially extending arcuate side surfaces disposed between the indentations in said shank section and having inner end portions disposed adjacent to the bottom surface of the groove and outer end portions disposed in the outer end portion of said shank section, said indentations and said arcuate side surfaces of said shank section cooperating to form a radially inner and axially extending side wall of the groove, said indentations in said shank section intersectioning said arcuate side surfaces of said shank section to form axially extending corners which apply shear forces to the material of the member upon application of torque loads to said fastener, each of said identations in said shank section includes an axially extending arcuate side surface which has a first radius of curvature, said rim having a flat bearing surface which is disposed in a plane extending perpendicular to the central axis of said shank section and which faces axially outwardly toward the outer end portion of said shank section and which is engageable with the material of the member, said rim including a plurality of axially extending indentations having inner end portions disposed adjacent to the bottom surface of the groove and outer end portions adjacent to said flat bearing surface, said rim including a plurality of axially extending flat side surfaces disposed between the indentations in said rim and having inner end portions disposed adjacent to the bottom surface of the groove and outer end portions disposed adjacent to said flat bearing surface, said indentations and said flat side surfaces of said rim cooperating to form a radially outer and axially extending side wall of the groove, said indentations in said rim intersecting said flat side surfaces of said rim to form axially extending corners which apply shear forces to the material of the member upon application of torque loads to said fastener, each of said indentations in said rim includes an axially extending arcuate side surface which has a second radius of curvature which is greater than said first radius of curvature, said flat side surfaces of said rim cooperating with said arcuate side surfaces of said shank section to form a constriction means for applying deformation forces to the material of the member upon application of torque loads to said fastener, said fastener and member cooperating to resist relative rotation under the combined influence of the cold working forces applied to the material of the member by said constriction means and of the shear forces applied to the material of the member by the corners of said rim and shank section.

4,708,557

DRILL SCREW

Kenzaburo Hashimoto, Hirakata, Japan, assignor to Fuji Tec Co., Ltd., Osaka, Japan

Filed May 8, 1986, Ser. No. 860,798
Claims priority, application Japan, Feb. 12, 1986, 61-28156
Int. Cl.[4] F16B *25/00*
U.S. Cl. 411—387 7 Claims



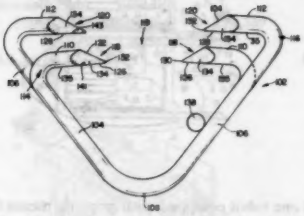
1. A drill screw comprising a threaded shank, a drilling portion formed at a forward end of said shank, and a head formed at a rearward end of said shank, said drilling portion including a body extending axially from said shank in a forward direction, a drilling tip extending forwardly from said body and having a pair of diametrically opposite axially extending flutes, cutting surfaces being formed by said flutes and terminating at cutting edges, said cutting edges including end cutting edges at the forward end of said drilling tip, inclined cutting edges extending rearwardly and angularly from said end cutting edges and located at opposite side edges of said drilling tip, and side cutting edges extending rearwardly from said inclined cutting edges and located at opposite side edges of said body, said end cutting edges being located at the forward end of said drilling tip without a web being provided between said end edges at the forward end of the drilling tip, and said end cutting edges and said inclined cutting edges lying in a diametral axial plane of said drilling portion and defining rake surfaces, said rake surfaces being angularly inclined relative to said cutting surfaces and said cutting surfaces being offset from said diametral axial plane.

4,708,558

WIRE FASTENER

Edward C. Musil, Lyons, Ill., assignor to Flexible Steel Lacing Company, Downers Grove, Ill.

Filed Feb. 21, 1986, Ser. No. 831,609
Int. Cl.[4] F16B *15/06*
U.S. Cl. 411—457 **7 Claims**



1. A fastener for penetrating a belt comprising:

a wire body having a central portion and a circular cross-section defining an outer cylindrical surface thereon,

a pair of legs extending angularly from opposite ends of the central portion and spaced apart at a predetermined distance, a pair of bent arms on the legs extending toward each other and defining a gap therebetween, sharpened pointed ends on the bent arms for penetrating the belt at spaced locations,

said pointed ends having four surfaces extending to and defining a tip including an upper inclined top surface which is substantially flat and which extends downwardly and inwardly, a flat bottom surface, and a pair of opposed flat sidewalls inclined inwardly at equal angles toward the tip,

said cylindrical surface having an outer surface portion facing outwardly and an inner surface portion facing inwardly,

each said flat bottom surface extending substantially coplanar with an inner surface portion on said bent arms, and

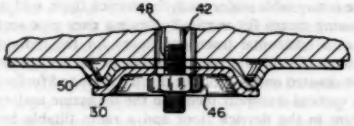
transition surfaces between said cylindrical surface portions of wire body and said inclined top surfaces and said inclined flat sidewalls of said pointed ends.

4,708,559

REINFORCING WASHER FOR A MINE ROOF BOLT ASSEMBLY

Frank M. Locotos, Bridgeville, Pa., assignor to F. M. Locotos Co., Inc., McMurray, Pa.

Filed Jul. 8, 1986, Ser. No. 883,168
Int. Cl.[4] F16B *43/02*
U.S. Cl. 411—545 **9 Claims**



1. A mine roof bolt assembly comprising:

a roof bolt having a shaft portion;

a bearing plate having one surface which substantially contacts the mine roof, an opposite surface having an annular embossment defining one of a convex and concave shape, and an aperture through which the roof bolt extends;

an annular washer comprising a rigid member having a substantially planar central portion, a slightly tapered annular intermediate portion and terminating in an annular skirt portion, an aperture through which said roof bolt extends, a first surface of said washer being shaped to contact and complement a substantial portion of the embossment on the opposite surface of the bearing plate when installed with a bearing plate defining a convex shape and a second surface of said washer being shaped to contact and complement a substantial portion of the embossment on the opposite surface of the bearing plate when installed with a bearing plate defining a concave shape whereby the annular skirt portion of the rigid member extends at least beyond and contacts the embossment defining the concave shape; and

means secured to the shaft portion of the bolt for holding the washer and the plate on the bolt and the plate against the mine roof.

4,708,560

BOOKBINDING METHOD USING STRIPS

William H. Abildgaard, Redwood City, Calif., and Karl Hymmen, Sparks, Nev., assignors to VeloBind, Inc., Sunnyvale, Calif.

Filed Aug. 19, 1985, Ser. No. 766,790
Int. Cl.[4] B42C *1/00*; B42B *5/08*; B42F *3/04, 13/00*
U.S. Cl. 412—7 **6 Claims**

1. A method of forming a book from sheets comprising:

(a) providing a first stip having a plurality of thermoplastic studs projecting therefrom at spaced intervals, said studs having elongated cylindrical portions and formed of a material severable into shorter lengths and deformable into heads and shaped to receive said sheets after first holes have been punched therein with said first holes fitting over said studs, the distal ends of said studs being shaped to form first punch means with sharp, radially inwardly extending surfaces forming with said cylindrical portions sharp first corners and the ends of said studs inward of said surfaces being formed concave about axes transverse to the longitudinal axes of said studs;

(b) providing a second strip having a flat planar surface, said second strip being formed with second holes of fixed size spaced at the same intervals as said studs dimensioned to receive said studs, said second holes comprising second punch means, said first holes being formed with sharp second corners with said planar surface, said strips being movable toward each other to accommodate any thickness of sheets fitting over said studs, said first and second punch means differing in size by a clearance such that said first and second punch means punch out of said sheets said first holes complementary to said distal ends of said studs;

(c) punching second holes in a batch of sheets by positioning said sheets between said first and second punch means and forcing said first and second punch means toward each other thereby punching out said second holes in said batch;

(d) retaining said batch on said studs after being punched; and

(e) forming rivet heads on said studs by heating and then cooling the same.

4,708,561

APPARATUS FOR ACCUMULATING AND TRANSPORTING STACKS OF PAPER SHEETS AND THE LIKE

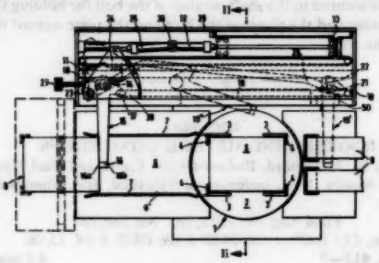
Peter Merkli, and Daniel Jermann, both of Oftringen, Switzerland, assignors to Grapha-Holding AG, Hergiswil, Switzerland

Filed Oct. 1, 1985, Ser. No. 782,683

Claims priority, application Switzerland, Oct. 1, 1984, 4705/84

Int. Cl.[4] B42C *5/00;* **B65G** *57/22, 25/02;* **B65H** *29/00*

U.S. Cl. 412—25 **19 Claims**



1. Apparatus for manipulating sheet-like commodities, particularly stacks of paper sheets, comprising a support; means for delivering to said support a succession of commodities along a first path; first and second conveyors disposed at the opposite sides of said support; a pusher for transferring commodities from said support to a selected conveyor; means for reciprocating said pusher between first and second positions along a predetermined path wherein the pusher advances from said first toward said second position to transfer a commodity from said support onto said first conveyor and from said second toward said first position to transfer a commodity from said support onto said second conveyor; and means for selectively diverting said pusher during advancement from at least one of said positions toward the other of said positions so that the pusher is prevented from intersecting said first path.

4,708,562

APPARATUS FOR LINING THE INNER WALL OF A VESSEL WITH BRICKS

Cornellie Mélan, Eberhardt, and Jean Liesch, Esch-sur-Alzette, both of Luxembourg, assignors to Paul Wurth S.A. and Arbed S.A., both of, Luxembourg

Filed Oct. 6, 1986, Ser. No. 915,635

Claims priority, application Luxembourg, Oct. 10, 1985, 86114

Int. Cl.[4] B65G *59/02;* **E04G** *21/22*

U.S. Cl. 414—10 **18 Claims**

1. Apparatus for lining the inner wall of a vessel with bricks comprising:

operating station means capable of being lowered or raised inside the vessel and including;

means for the intermediate storage of at least two brick pallets;

automatic means for handling the bricks; and

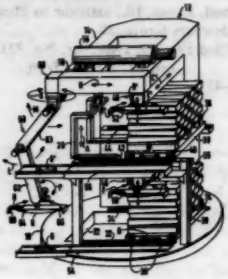
means for raising or lowering the pallets towards the operating station;

wherein said operating station further includes;

at least two levels for superimposing said pallets above one another; and

said automatic brick handling means comprising;

at least one automatic depalletizing means for transferring the bricks from each of the superimposed pallets onto at least one stand-by track; and



at least one robot equipped with gripping means for picking up the bricks located on the stand-by track and for depositing the bricks at an intended location.

4,708,563

ARRANGEMENT FOR STORING PIPES

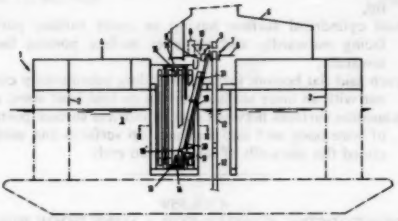
Frans J. Van Den Berg, and Robert A. Viergever, both of Vlissingen, Netherlands, assignors to B.V. Koninklijke Maatschappij "De Schelde", Netherlands

Filed Sep. 9, 1985, Ser. No. 774,245

Claims priority, application Netherlands, Sep. 7, 1984, 8402734

Int. Cl.[4] E21B *19/14*

U.S. Cl. 414—22 **6 Claims**



6. An arrangement for storing pipes in an offshore drilling installation whose upper deck, above a portion forming the derrick floor, carries a derrick with appurtenant equipment, such as hoisting means with lowering tools, and a rotary table is mounted in the derrick floor, which pipe storage apparatus comprises a pipe magazine extending adjacent to, and laterally of, the rotary table underneath the derrick floor, said magazine containing means for vertically storing riser pipe sections, as well as a horizontal transport means for the individual displacement of riser pipe sections between the storage means and a zone situated underneath the derrick floor and further including a vertical transport means in the magazine underneath an aperture in the derrick floor and a ramp tiltable between a vertical position aside a rotary table opening and a position inclined with the top towards the rotary table opening, characterized in that the storage means are formed by a plurality of turrets arranged along the path of the horizontal transport means, each carrying a plurality of pipe sections in a single circumferential row, each turret is rotatable about a vertical axis so that each pipe section, through rotation of the turret concerned, can be brought within reach of the horizontal transport means, and two carriages movable along the ramp, each having a pipe-engaging arm for gripping a collar of a pipe section and having such a path of movement that a pipe section supported by the two carriages can be positioned with the top

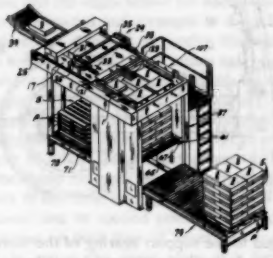
end within reach of the hoisting equipment and the lower carriage can guide the bottom end of the pipe section to adjacent the derrick floor.

4,708,564

PALLETIZING APPARATUS

William J. Mylrea, Denver, and Gerald C. Thompson, Broomfield, both of Colo., assignors to Master Conveyor Corporation, Englewood, Colo.

Filed Jul. 7, 1986, Ser. No. 882,269
Int. Cl.[4] B65G 57/24
U.S. Cl. 414—36 **8 Claims**



8. Apparatus for stacking items on a pallet in layers each comprising a plurality of the items, said apparatus comprising: an air table having a forward and a rearward end;

a conveyor for delivering items to the air table over the rearward end of the table for arranging in a layer on the table, said conveyor having an exit end over which items are delivered to the table;

means supporting the table movable relative to the conveyor between an advanced position wherein the table extends forward from the exit end of the conveyor with the rearward end of the table adjacent the exit end of the conveyor, and a retracted position wherein the table is below the conveyor;

means for moving the table supporting means and the table between said positions;

means mounting the table on said table supporting means with the table overlying said supporting means and for movement of the table relative to the supporting means when the table is in its said advanced position between a raised position inclined upwardly toward said exit end of the conveyor for receiving items from the conveyor with the rearward end of the table positioned for relatively smooth passage of the items from the conveyor on to the table, items delivered on to the table sliding down on the table in the directon toward its forward end and accumulating in a layer on the table, and a lowered position wherein the table is below the conveyor for the retraction of said table supporting means and said table below the conveyor;

means for effecting movement of the table to its raised position when in its advanced position for receiving items from the conveyor and movement of the table to its lowered position when in its advanced position for withdrawing the table from under the layer of items thereon by moving the table, so lowered, from its advanced to its retracted position;

means for holding a pallet and layers of items stacked thereon below the advanced position of the table supporting means and the table, a first layer of items which is arranged on the table being deposited on a pallet held by the pallet holding means when the table is withdrawn and each successive layer being deposited on the preceding layer on the pallet when the table is withdrawn;

said pallet holding means comprising an elevator movable upwardly from a lowered position and back down to its lowered position;

means for holding a supply of pallets below the conveyor and below the retracted position of the table supporting means and the table;

means for delivering a pallet from the supply to the elevator when the elevator is in its lowered position; and

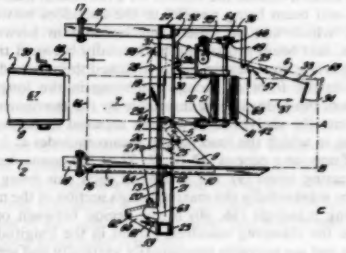
said table supporting means when in its advanced position overlying the elevator and positioned for engagement of the bottom thereof by the top layer of items on a pallet on the elevator when the elevator is raised and acting as a compression member for compression of the layers of items on the pallet on the elevator.

4,708,565

DEVICE FOR STACKING RECTANGULAR BALES OF STALKY MATERIAL

Jürgen Röhrbein, Vechelde-Wahle, Fed. Rep. of Germany, assignor to Gebrüder Welger GmbH & Co. Kommanditgesellschaft, Wolfenbüttel, Fed. Rep. of Germany

Filed May 7, 1985, Ser. No. 731,503
Claims priority, application Fed. Rep. of Germany, May 8, 1984, 3416907
Int. Cl.[4] A01F 15/18; B65G 57/20
U.S. Cl. 414—86 **10 Claims**



1. Apparatus for stacking rectangular bales of stalky material cooperatively arranged downstream of a compression duct of a bailing press, said compression duct having a discharge end defining a compression duct floor lying in a generally horizontal plane, comprising: a horizontal platform located directly adjacent said discharge end of said compression duct; vertical guide members supporting said horizontal platform at two sides thereof; means for moving said horizontal platform vertically between an uppermost position and a plurality of positions therebelow, said uppermost position of said horizontal platform being in said horizontal plane of said compression duct floor; said platform operating to receive from said compression duct bales of stalky material and after loading thereon of a bale of stalky material being lowered from said uppermost position in a plurality of stages corresponding to the height of said bale so that a plurality of said bales of stalky material can be stacked one atop another on said platform; and drivable forward feed elements acting on said bales of stalky material emitted from said compression duct onto said platform to separate each of said bales from a succeeding bale still located in said compression duct before or at the same time said platform is lowered.

4,708,566

STACK CONVEYOR AND HANDLER IN THE FORM OF A CRANE

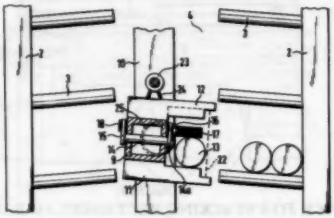
Paul Stolzer, Achern, and Dieter Spath, Oberachern, both of Fed. Rep. of Germany, assignors to Keuro Maschinenbau Gesellschaft mit beschrankter, Haftung & Co. Kommanditgesellschaft, Achern-Gamshurst, Fed. Rep. of Germany

Filed May 5, 1986, Ser. No. 859,947

Claims priority, application Fed. Rep. of Germany, May 11, 1985, 3517061

Int. Cl.[4] B65G 65/02

U.S. Cl. 414—276 20 Claims



1. A stack conveyor and handler in the form of a crane, in particular for warehouse or storage system use, for rod-like material, having stack frames disposed crosswise to and aligned with one another in a longitudinal direction which are provided in a shelf-like manner with adjacent rows of supporting arms for the material, the rows being arranged one above the other extending in the longitudinal direction and are secured on vertical supports, wherein the crane, which is movable crosswise to the corridors between stacks, has vertical guides located outside the shelves for a horizontal load-bearing beam, said beam being parallel to the corridors between the stacks, which can be raised and lowered in between the shelves, said beam protruding horizontally between the rows of supporting arms having firmly attached thereto load pickup means in the form of prongs extending in the longitudinal direction, the prongs being insertable by the movement of the crane into the shelves so as to store material or remove from storage, in which the load pickup means includes at least one pair of opposing prongs (11 or 12; 32 or 33) connected to the load-bearing beam (9), the prongs in each pair being spaced apart by substantially the maximal cross section of the material; clamping mandrels (16, 40) in the region between opposing prongs, the clamping mandrels extend in the longitudinal direction and are movable substantially vertically and are fastenable against the prongs for clamping the material (13), the length of the mandrels being substantially equal to that of the prongs; a load-bearing beam is supported on a means (10) for movement on vertical guides (6) connected to the crane such that said load bearing beam is rotatable about a horizontal axis between at least two operating positions, wherein the prongs extend in the longitudinal direction and are also parallel to said corridors (4) between the stacks.

4,708,567

MOTIVE POWER DEVICE FOR A DELIVERY DEVICE FOR A SILO OR A SIMILAR UPRIGHT CONTAINER

Herbert Greeb, Dillenburg, Fed. Rep. of Germany, assignor to Gebrüder Weiss K. G., Fed. Rep. of Germany

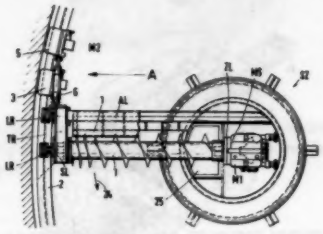
Filed Feb. 14, 1986, Ser. No. 829,793

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1985, 3505533

Int. Cl.[4] B65G 65/46

U.S. Cl. 414—310 5 Claims

1. A motive power device for a delivery system located at the base of an upright silo or similar container, comprising at least one delivery worm having first and second ends and a longitudinal axis, the worm rotatable about the longitudinal axis, the first end of the worm attached to a central bearing across the bottom surface of the silo, the second end of the worm having a support bearing, a cantilever member carrying the worm connected to the support bearing, the support bearing placed on an abutment located adjacent the silo wall, a first motor at the first end of the worm for effecting the rotation of the worm and a second motor at the second end of the worm for effecting the swivelling motion of the worm, the second motor being a controllable hydraulic work cylinder, a first braking device self-locking counter to the swivel motion of the worm and acting on the abutment, an end of the work cylinder hinged to the first braking device, the outer end of the work



cylinder hinged to the support bearing of the worm, wherein the first braking device has upper and lower brake shoes each facing the abutment, the braking device further including an articulated tongue for flexibly connecting the brake shoes, the brake shoes movable between the braking position in which both brake shoes are immovably pressed against the abutment and a released position, the braking position effected by a translatory movement introduced via the work cylinder to the upper brake shoe counter to the drive direction of the worm and the released position effected by a movement in the drive direction of the worm.

4,708,568

APPARATUS FOR SUPPLYING FLATTENED BOXES TO A PACKAGING MACHINE

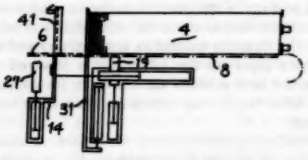
Franco Odorici, Gaggio Montano, Italy, assignor to Azionaria Construzioni Macchine Automatiche-A.C.M.A. S.p.A., Bologna, Italy

Filed May 15, 1986, Ser. No. 863,631

Claims priority, application Italy, May 16, 1985, 3445 A/85

Int. Cl.[4] B65H 1/26

U.S. Cl. 414—330 7 Claims



1. A supply device for supplying flattened boxes to a packaging machine equipped so that it may be re-supplied with these boxes, comprising a magazine for a line of boxes which is bounded at the front by a support face and comprises feed means which supports the line of boxes, and which moves longitudinally relative to the magazine in cooperation with feed means of the packaging machine, a front carriage and a rear carriage mounted to slide longitudinally relative to the magazine, clamp means mounted on each carriage which may be respectively actuated to connect them to the feed means, wherein the clamp means of the front carriage is normally operative and the clamp means of the rear carriage is normally inoperative, operating means disposed between the carriages

which may be actuated so that the carriages slide in a longitudinal manner towards or away from one another, the operating means normally being inoperative and the carriages spaced from one another, a main plate displaceably mounted on the front carriage which may be moved transversely between a first position in register with the line of boxes and a second remote position, the main plate normally being in the first position and acting such that it forms a rear boundary for the line of boxes, a secondary plate is mounted on the rear carriage so as to face the main plate, the secondary plate normally being remote from the main plate so as to define with the latter a space for containing an additional supply of boxes, the secondary plate comprising a recess bounded by edges at the front so that the plate and the edges bound the additional supply at the rear and so constructed and arranged as to be intersected by the main plate and arranged to receive the main plate in its recess, and controls of the clamp means and operating means and controls for the main plate, the controls being coordinated in such a way that once the additional supply has been provided, the operating means causes the secondary plate to slide longitudinally towards the main plate so as to move the additional supply of boxes closer together and to make it more compact, the clamp means of the rear carriage is actuated, the clamp means of the front carriage is deactuated and the main plate is moved into its second position, the secondary plate thereafter acting on both lines of boxes, the operating means continuing to move the main plate and secondary plate towards one another until the main plate reaches the secondary plate, the main plate then being returned to its first position, received in the recess in the secondary plate, the clamp means of the front carriage then being reactuated and the clamp means of the rear carriage deactuated and the operating means causing the carriages to slide apart.

4,708,569

SILO

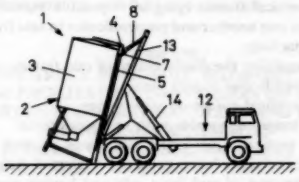
Harry Nijenhuis, Hoogeveen, Netherlands, assignor to Hydro Mecanique Research S.A., Luxembourg, Luxembourg

Filed Nov. 3, 1986, Ser. No. 925,924

Claims priority, application Switzerland, Nov. 7, 1985, 4790/85

Int. Cl.[4] B60P *1/64*

U.S. Cl. 414—332 **7 Claims**



1. Silo having an attachment device for connecting the upper portion of the silo to a tippable loading frame of a transport vehicle, with improvements characterized by the attachement device comprising at least one vertically extending fixed guide extending along the silo container, a stop on the guide at the upper portion of the silo, and a coupling element slidable along the guide for connecting said silo via a cable to said tippable loading frame.

4,708,570

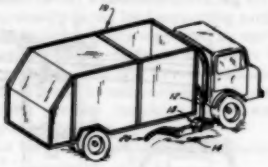
UNIVERSAL CONTAINER GRABBER APPARATUS FOR A REFUSE COLLECTION VEHICLE

Fred T. Smith, Palos Verdes Penninsula, and Fred P. Smith, Lomita, both of Calif., assignors to The Heil Co., Milwaukee, Wis.

Filed Jul. 1, 1985, Ser. No. 750,138

Int. Cl.[4] B65F *3/06*; B66C *3/16*

U.S. Cl. 414—408 **23 Claims**



1. Apparatus for grabbing a refuse container, the apparatus comprising:

a base member,

a first articulated clamp arm including a first arm section having opposite ends, one of said opposite ends of said first arm section being pivotably connected to said base member, a second arm section having opposite ends, one of said opposite ends of said second arm section being pivotally connected to the other of said opposite ends of said first arm section,

a first link having opposite ends, one of said opposite ends of said first link being pivotally connected to said base member and the other of said opposite ends of said first link being pivotably connected to said second arm section intermediate its opposite ends,

a second articulated arm positioned in opposed spaced relation from said first articulated arm and movable toward and away from said first articulated arm to clampingly engage a container therebetween, said second articulated arm including a first arm section having opposite ends, one of said opposite ends of said first arm section of said second articulated arm being pivotally connected to said base member, a second arm section having opposite ends, one of said opposite ends of said second arm section of said second articulated arm being pivotally connected to the other of said opposite ends of said first arm section of said second articulated arm, and

a second link having opposite ends, one of said opposite ends of said second link being pivotably connected to said base member and the other of said opposite ends of said second link being pivotably connected to said second arm section of said second articulated arm intermediate its opposite ends.

4,708,571

METHOD OF AND APPARATUS FOR THE INTRODUCTION OF RADIOACTIVE METALLIC WASTES INTO A MELTING FURNACE

Manfred Sappok, Tönisvorst, Fed. Rep. of Germany, assignor to Siempelkamp Giesserei GmbH & Co., Krefeld, Fed. Rep. of Germany

Filed Dec. 23, 1985, Ser. No. 812,391

Int. Cl.[4] G21C *19/00*; B65G *65/00*

U.S. Cl. 414—412 **10 Claims**

4. A radioactive metallic waste disposal apparatus comprising:

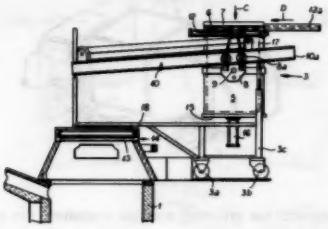
a transport vessel containing therein radioactive metallic waste, said vessel having a transport vessel cover;

a melting furnace having a mouth formed with a seating ring and provided with a horizontally shiftable slider sealing said mouth at said ring;

a furnace charging container which has an opening and generally conforms in shape to said vessel;

means for supporting said container to enable said container to swing from an upright position in which said opening can receive said transport vessel through 180° about a horizontal axis into an inverted position in which said container opens into said mouth of said furnace;

a laterally retractable container cover adapted to close said container upon the insertion of said transport vessel



therein, said container cover being retractable when said container is positioned inverted over said mouth of said furnace to enable the discharge of said transport vessel and radioactive waste contained therein into said furnace; and

means for retracting said container cover and said slider independently of one another to communicate the interior of said container with the interior of said furnace through said mouth.

4,708,572

VEHICLE FOR THE DELIVERY OF DRINKS

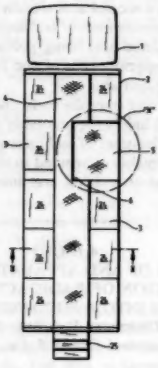
Carl W. Kölker, Himmelrich 18, 6340 Baar, Switzerland

Filed Aug. 25, 1986, Ser. No. 899,950

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1985, 8526052

Int. Cl.[4] B60P *1/02*

U.S. Cl. 414—540 **3 Claims**



1. In a vehicle for the delivery of drinks, the vehicle comprising a loading platform extending in a longitudinal direction and defining a loading surface, the improvement comprising a central walkway on the loading platform extending in the longitudinal direction, the loading surface comprising a pair of lateral loading surfaces on opposite lateral sides of said walkway, said walkway being at a higher level than the lateral loading surfaces, said central walkway having a lateral recess in a lateral side thereof, a lifting platform having a raised position which is aligned and flush with said walkway, and a lowered position below said walkway, said lifting platform having spaced apart inner and outer edges extending in the longitudinal direction, the distance between said inner and outer edges in a transverse direction extending transversely to the longitudinal direction, being substantially equal to one half the transverse width of the loading platform, said lifting platform while in its raised position being engaged in said recess and extending substantially from a longitudinal center of the loading platform to a lateral edge of the loading platform, and means for mounting said lifting platform for movement between said raised and lowered positions.

4,708,573

APPARATUS FOR THE HANDLING OF METAL SHEETS

Peter Hug, Safenwil, Switzerland, assignor to Hammerle AG, Zofingen, Switzerland

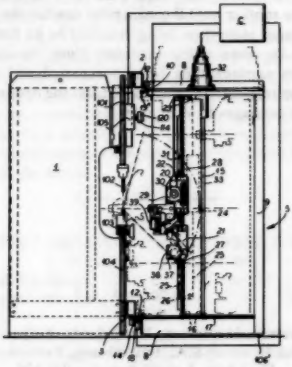
Filed Oct. 3, 1984, Ser. No. 657,347

Claims priority, application Austria, Oct. 4, 1983, 3509/83

The portion of the term of this patent subsequent to Dec. 10, 2002, has been disclaimed.

Int. Cl.[4] B21D *43/10, 43/11*

U.S. Cl. 414—589 **17 Claims**



1. An apparatus for positioning a metal sheet workpiece in a metal-working machine having a front side and comprising in combination with said machine:

a pair of vertical frames lying in respective vertical plane parallel to one another and perpendicular to said front side of said machine;

means for enabling the displacement of said frames horizontally perpendicular to said planes;

respective vertical guides on said frames;

respective tongs engageable with said workpiece;

means for vertically displacing said tongs on said guides, each of said frames being generally C-shaped, being open in the direction of said front side and having upper and lower shanks extending toward said machine, said front side of said machine having horizontal beams engageable with the upper and lower shanks of each of said frames for guiding said upper and lower shanks for horizontal movement parallel to said front side, said vertical guides of the respective frames being mounted on the upper and lower shanks of the respective frame; and

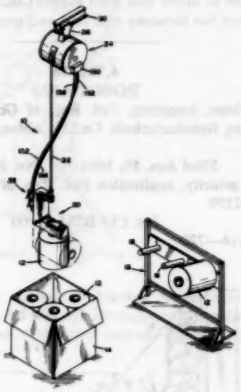
means for mounting said upper and lower shanks for said horizontal movement parallel to said front side along said horizontal beams.

4,708,574

APPARATUS FOR HANDLING OBJECTS

Stewart J. Conboy, Saint Clair Shores, and Robert J. Kish, Flint, both of Mich., assignors to D. W. Zimmerman Mfg., Inc., Madison Heights, Mich.

Filed Jul. 5, 1985, Ser. No. 751,869
Int. Cl.[4] B66C 1/02
U.S. Cl. 414—591 15 Claims



1. Apparatus for handling objects having passages therein, said apparatus comprising an upper housing, a lower housing, a gripper extending outwardly from said lower housing to be received in the passages of the objects, said gripper including a fluid-operated ram for causing said gripper to grip said object in said passage and for causing said gripper to release from said passage, means forming an articulated joint between said housings to enable said lower housing to move relative to said upper housing in a manner to enable said gripper to move between a generally vertical position and a generally horizontal position, an overhead, fluid-operated hoist, an elongate, flexible member extending downwardly from said hoist, said upper housing having means to receive said flexible, elongate member, locking means engagable with said articulated joint to lock said lower housing in either of two positions relative to said upper housing with said gripper in either of the vertical and horizontal positions, release means carried by said upper housing for releasing said locking means, a manually-operable hoist control mounted on said upper housing, a handle on said lower housing on the side opposite said gripper, and manually operated gripper valve on said lower housing adjacent said handle for operating said fluid-operated ram.

4,708,575

FORKLIFT TRUCK PUSH-PULL SLIPSHEET HANDLER FOR FACILITATING CONVERSION OF TRUCK BETWEEN SLIPSHEET HANDLING AND PALLET HANDLING CAPABILITIES

Stanley E. Farmer, Corbett, Oreg., and Richard D. Seaberg, Vancouver, Wash., assignors to Cascade Corporation, Portland, Oreg.

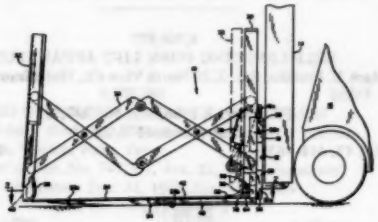
Division of Ser. No. 741,727, Jun. 6, 1985, Pat. No. 4,624,620, which is a division of Ser. No. 634,694, Jul. 26, 1984, abandoned, which is a division of Ser. No. 493,141, May 9, 1983, Pat. No. 4,482,286. This application Nov. 21, 1986, Ser. No. 933,759
Int. Cl.[4] B66F 9/14
U.S. Cl. 414—607 4 Claims

1. A push-pull slipsheet handler adapted for rapid mounting and demounting with respect to a pair of transversely-spaced load-lifting forks having upwardly-facing load-supporting surfaces thereon, said forks being mounted on a vertically-movable lift truck carriage, said push-pull slipsheet handler comprising:

(a) a push-pull assembly including a frame, a push plate, power means for selectively extending and retracting said push plate with respect to said frame and selectively openable and closable jaw means on said push plate for gripping a slipsheet;

(b) platen means overlying said forks and extending transversely therefrom for supporting a slipsheet thereon, said platen means having a downwardly-facing surface engaging said upwardly-facing load-supporting surfaces of said forks so as to be vertically supported by said upwardly-facing load-supporting surfaces, said forks being of a standard pallet-handling type having upstanding portions supported vertically by said carriage and having forwardly-protruding portions containing said upwardly-facing load-supporting surfaces; and

(c) means for connecting said frame of said push-pull assembly to said platen means for mounting and demounting of said frame and platen means as a unit with respect to said forks and carriage, including elongate, forwardly-extending interconnecting means rigidly connected to said frame of said push-pull assembly independently of said platen means and to said downwardly-facing surface of said platen means for rigidly holding said platen means and said frame at a fixed angle relative to each other and thereby restraining said platen means against upward tilting relative to said load-supporting surfaces of said forks when upward force is exerted on the forward extremity of said platen means, said interconnecting means extending longitudinally forward alongside said forwardly-protruding portions of said forks beneath said platen means in forwardly overlapping relation to said platen means, said interconnecting means being free of any connection to said forwardly-protruding portions of said forks effective to enable said forwardly-protruding portions to resist said upward tilting of said platen means.

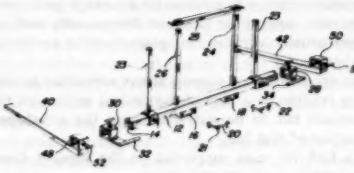


4,708,576

ACCESSORY FOR EXPANDING THE PAYLOAD CAPACITY OF A FORKLIFT

Challie Conley, Villa Park, Calif., assignor to Emmett Hines, Dana Point, Calif.

Filed Jan. 8, 1986, Ser. No. 817,147
Int. Cl.[4] B66F 9/06
U.S. Cl. 414—607 19 Claims



10. A forklift extension kit for permitting a forklift vehicle,

having a pair of forks, to securely carry wide loads, comprising:

an elongated base member adapted to be mounted to the forks and to extend on either side of the forklift vehicle;

a pair of first bracket members, adapted to extend around the base member and to be slidable along the base member, for locking the base member to the forks;

a pair of movable fork assemblies, each having a fork member and a second bracket member, the second bracket member is adapted to extend around the base member and to be slidable along the base member, while retaining the fork member in a parallel alignment with the forklift forks, and

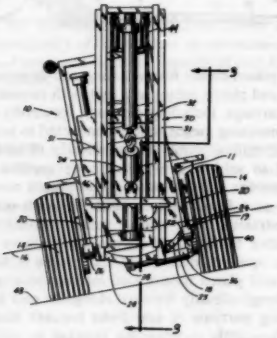
means for releasably securing the fork assemblies along the operative length of the base member whereby a load wider than the width of the position of the forklift forks can be supplementally supported through positioning of the fork assemblies along the base member.

4,708,577

SELF-LEVELING FORK LIFT APPARATUS

Mark E. Fratzke, Rte. 3, 25 North View Ct., Hutchinson, Minn. 55350

Filed Apr. 3, 1986, Ser. No. 847,512
Int. Cl.[4] B66F 9/22
U.S. Cl. 414—635 **9 Claims**



1. A self-leveling fork lift apparatus for use with a lift truck which includes a wheel supported main frame, a pair of primary load support wheels supported on a first front end portion of the main frame to rotate on a common axis, a pair of integral, parallel, spaced-apart extensions of the main frame extending forwardly of the load support wheels, and means to steer and propel the truck, said apparatus including:

A. an elongate mast support bar having a central arc-shape guide portion and two concentric outer end portions, each extending integrally outwardly from the central arc-shape portion;

B. bar support means to support the concentric outer end portions of the mast support bar on the spaced-apart main frame extensions to position the arc-shape guide portion of the mast support bar to extend downwardly and to lie in a substantially vertical first plane parallel to the support wheels axis;

C. an arc-shape mast support sleeve supported in surrounding relation to a part of the central portion of the mast support bar to be movable along the arc-shape guide portion of that bar;

D. a fork lift mast supported on the support sleeve and extending upwardly therefrom;

E. mast positioning means to position the mast in an upright position with respect to the main frame;

F. a power operated fork lift carriage supported on the mast for longitudinal movement up and down the mast;

G. said mast support sleeve being movable between a first position whereby the mast is tilted toward a first side of a second plane perpendicular to the support wheels rotation axis and lying midway between said support wheels, and a second position whereby the mast is tilted toward a second side of the second plane; and

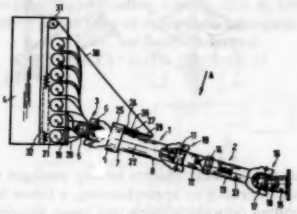
H. means to move said mast support sleeve along said mast support bar between said first and second positions.

4,708,578

ROBOT ARM

Hans Richter, Augsburg, Fed. Rep. of Germany, assignor to Blomberg Robotertechnik GmbH, Ahlen, Fed. Rep. of Germany

Filed Jun. 19, 1984, Ser. No. 622,242
Claims priority, application Fed. Rep. of Germany, Jun. 21, 1983, 3322199
Int. Cl.[4] B25J 11/00
U.S. Cl. 414—720 **21 Claims**



1. A robot arm formed of several links, hinges interconnecting said links to form joints, an actuating mechanism comprised of a universal joint connecting an upper link, the latter forming an upper arm link, to a support structure, a uniaxial joint connecting the upper arm link to a lower link, the latter link forming a lower arm link, a lever hinged to a part of the upper arm link which is connected to the universal joint having a first and another lever arm, the first lever arm pointing in the direction of the lower arm link when the lonqitudinal axes of the upper and lower arm links are in alignment with one another, means for applying an upwardly directed force on the first lever arm, the lower arm link being connected to said another lever arm whereby the lever is turned by the lower arm link in the event the lower arm link is turned out of its alignment with the upper arm link, thereby turning said first lever arm in the direction of the universal joint.

4,708,579

HYDRAULICALLY OR MANUALLY ACTUATED IMPLEMENT COUPLER FOR FRONT END LOADERS

James R. Baird, Akron, and Steve Kabay, Novelty, both of Ohio, assignors to JRB Company, Inc., Akron, Ohio

Filed Jul. 27, 1984, Ser. No. 635,131
Int. Cl.[4] E02F 3/40
U.S. Cl. 414—723 **5 Claims**

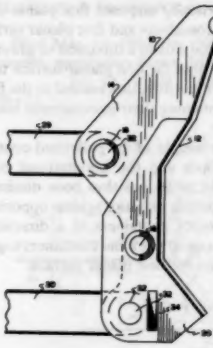
4. A coupler for a front end loader having upper and lower arms, comprising:

a male master portion having a contoured face plate with a slot therein, said slot being between two vertical parallel plates forming a channel therebetween, said plates having a bridges pin extending across a top portion thereof, and an extendable pin selectively operable to extend across said channel in juxtaposition to said slot;

a female coupler portion comprising a plate having a hook at an upper section thereof adapted for receipt by said bridged pin, and a protruding eye at a lower section

thereof adapted for receipt with said slot and in engagement with said extendable pin; and

wherein said plate of said female coupler portion further



includes a support surface protruding from said plate between said hook and said eye for supporting contacting engagement with said contoured face of said male master portion.

4,708,580

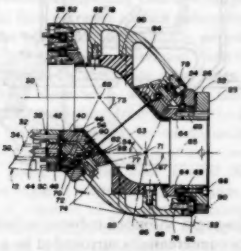
MECHANICAL WRIST MECHANISM

Hadi A. Akeel, Sterling Heights, Mich., assignor to GMF Robotics Corporation, Auburn Hills, Mich.

Continuation of Ser. No. 692,994, Jan. 22, 1985, abandoned. This application Nov. 10, 1986, Ser. No. 928,745

Int. Cl.[4] B25J *17/02*

U.S. Cl. 414—735 **7 Claims**



1. A mechanical wrist mechanism for positioning a work tool comprising:

three independent rotational axes, a first pair of said axes having a first point of mutual intersection and a second pair of said axes having a second point of mutual intersection offset from said first point;

first and second housing means defining an internal wrist cavity including a gear housing compartment and a tool service compartment and rotatably supported on respective ones of first and second of said axes, the first housing means including an arm-mounting surface;

a tool support member rotatable on a third of said axes including a tool-mounting surface;

gear means disposed in said gear housing compartment for providing independent rotation of said tool support member and said second housing means about their respective axes for selectively establishing the position of said tool-mounting surface within a work envelope; and

continuous unobstructed passage means between the arm-mounting surface and the tool-mounting surface for the enclosed containment of work tool related structures wherein said passage means includes guide means mounted for rotation with said first and second housing means for defining said gear housing and tool service compartments in the first and second housing means including said first and second points of mutual intersection and cooperating with said first and second housing means for sealing said gear housing compartment to prevent contamination of said tool service compartment.

4,708,581

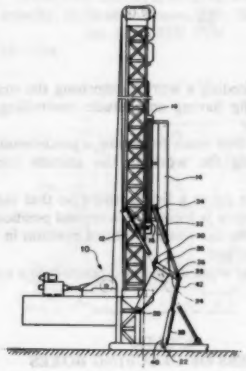
METHOD OF POSITIONING A TRANSFER ARM

Harold L. Adair, Rockwall, Tex., assignor to W-N Apache Corporation, Wichita Falls, Tex.

Continuation of Ser. No. 747,351, Jun. 21, 1985, abandoned. This application Dec. 31, 1986, Ser. No. 4,205

Int. Cl.[4] E21B *19/14*

U.S. Cl. 414—786 **5 Claims**



1. A method for operating a drilling apparatus of the type having a drilling mast, a rigid transfer arm mounted on a first axis adjacent the mast to move between a lower postion near ground level and an upper position aligned with the mast, and a reaction point which is fixed with respect to the drilling mast and is spaced from the first axis, wherein the method comprises the following steps:

(a) providing a linkage comprising: a fixed length link pivotably mounted to the transfer arm at a second axis, spaced from the first axis, said link defining a distal end; a first hydraulic actuator pivotally mounted at one end to the distal end of the link and at the other end to the transfer arm; and a second hydraulic actuator pivotally mounted at one end to the distal end of the link and at the other end to the reaction point; and

(b) supplying pressurized hydraulic fluid to both the first and second hydraulic actuators when the transfer arm is in the lower position in order to extend both the first and second hydraulic actuators to raise the transfer arm to the upper position.

4,708,582

METHOD FOR FEEDING A WORK

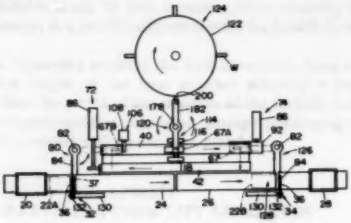
Shuji Hamada, Yokohama, and Akira Yamamoto, Tokyo, both of Japan, assignors to Niigata Engineering Co., Ltd., Tokyo, Japan

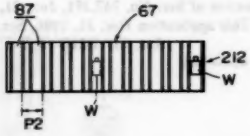
Filed Sep. 23, 1986, Ser. No. 910,520

Claims priority, application Japan, Sep. 24, 1985, 60-210468; Nov. 22, 1985, 60-263147

Int. Cl.[4] B65G *47/24*

U.S. Cl. 414—786 **4 Claims**





1. A method of feeding a work, comprising the steps of:
(a) preparing a jig having an attitude controlling groove formed therein;
(b) controlling a first work to assume a predetermined attitude by placing the work in the attitude controlling groove;
(c) conveying the jig to a first position so that the attiude controlling groove is located at a second position;
(d) then, moing the fist work to a third position in the controlling groove; and
(e) transferring the work at the third position to a machining device.

4,708,583

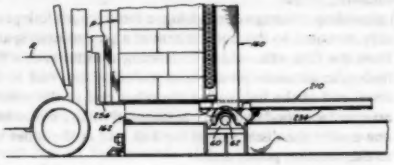
PROCESS OF RECUBING BOXES

Lenard E. Moen, 12333 E. Los Nietos Rd., Santa Fe Springs, Calif. 90670

Division of Ser. No. 479,800, Mar. 23, 1983, abandoned. This application Dec. 18, 1985, Ser. No. 810,215

Int. Cl.[4] B30B *13/00*

U.S. Cl. 414—786 **5 Claims**



1. A method of tightly cubing a plurality of containers into a plurality of adjacent rows each having a plurality of tiers of the containers, comprising:

loading a plurality of the containers onto a pallet in a plurality of adjacent rows, each row having a plurality of tiers, thus defining a cubed plurality of the containers gravitationally biased together onto the pallet;

positioning the palletized cubed containers with a vertical side adjacent a vertically disposed first planar surface;

tilting the palletized containers and first planar surface about a common horizontal axis in a direction to gravitationally bias the containers onto the first planar surface to pack the containers together in a direction normal to the first planar surface while maintaining their gravitational bias onto the pallet; and,

after a portion of the weight of the palletized containers has passed over said axis and the gravitational bias of the containers onto the pallet has thus been diminished, initially applying opposing pressure against opposite faces of the cubed plurality of containers in a direction that is parallel to the tilt axis to pack the containers together in a direction parallel to the first planar surface.

4,708,584

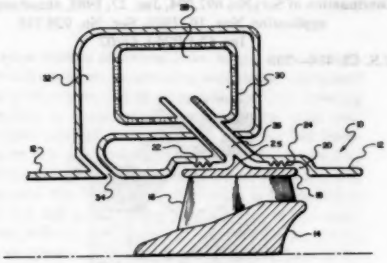
SHROUDED INDUCER PUMP

Sen Y. Meng, Reseda, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 9, 1986, Ser. No. 917,337

Int. Cl.[4] F04D *29/66*

U.S. Cl. 415—53 R **12 Claims**



1. In a pump having a shrouded inducer including at least one spiral blade circumferentially surrounded by a shroud, the inducer and blade being rotatably mounted within the housing, said housing having a fluid inlet and a fluid outlet and wherein an annular space defined by an outer periphery of the shroud and an adjacent surface of the housing conveys a recirculation fluid flow over the shroud during operation of the pump, an improvement for alleviating cavitation damage associated with the recirculation flow said improvement comprising:

a first seal means located in said annular space adjacent an upstream end of said shroud;

a second seal means located in said annular space adjacent downstream of said first seal means;

vaneless diffuser means comprising a fluid passageway in said housing having one end opening into said annular space intermediate said first and second seal means;

a mixing chamber in fluid communication with another end of said passageway, said mixing chamber having at least one fluid permeable wall portion forming the only fluid outlet from said chamber; and

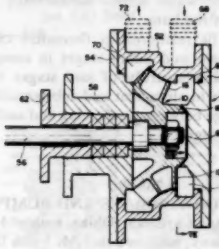
diverter means located on the outer periphery of said shroud intermediate said first and second seal means for directing recirculation fluid flow into said diffuser means.

4,708,585

CENTRIFUGAL PUMP

Tetsuo Fukazawa, Tokyo, and Shigeyoshi Yokoyama, Sakura, both of Japan, assignors to Nihon Radiator Co., Ltd. and Pacific Machinery & Engineering Co., Ltd., both of Tokyo, Japan

Filed Mar. 14, 1986, Ser. No. 839,772
Claims priority, application Japan, Mar. 15, 1985, 60-50576
Int. Cl.[4] F04D *17/06*
U.S. Cl. 415—72 **3 Claims**



1. In a centrifugal pump of the type comprising a casing:
an annular channel defining an inlet to said pump;
a centrifugal impeller arranged for rotation in said casing, said centrifugal impeller including a hub and at least one blade wound in convolutions on a peripheral surface of the hub; and
a stationary guide vane which is secured to said casing in said annular fluid channel at the pump inlet, said vane extending parallel and radially with respect to the axis of rotation of the impeller and located immediately before the impeller,
the improvement comprising said centrifugal impeller having a fluid flow entrance surface substantially parallel to a blade inlet plane and substantially perpendicular to the axis of rotation of the impeller, said blade inlet plane being a plane formed by the blade inlet when the impeller is rotated, said blade being wound in a suitable number of convolutions extending from an inlet to an outlet of the blade on the hub and being forwardly inclined toward the axis of rotation of the impeller at an increasingly greater angle in going from the inlet toward the outlet of the blade, the angle of inclination of the blade with respect to the axis of rotation of the impeller being arbitrarily selected from the range between 0 and 90 degrees, and the convolutions of said blade define on the hub one or more fluid channels which are nearly equal in cross-sectional area.

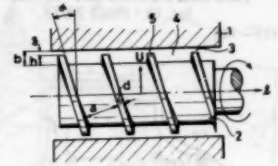
4,708,586

THREAD GROOVE TYPE VACUUM PUMP

Tadashi Sawada, Akita; Tatsuji Ikegami, Sakai, and Masashi Iguchi, Hachioji, all of Japan, assignors to Rikagaku Kenkyusho, Wako and Osaka Vacuum, Ltd., Osaka, both of, Japan

Filed Aug. 14, 1986, Ser. No. 896,470
Claims priority, application Japan, Aug. 14, 1985, 60-179039; Aug. 14, 1985, 60-179040; Aug. 14, 1985, 60-179041
Int. Cl.[4] F04D *3/02*
U.S. Cl. 415—72 **3 Claims**

1. A thread groove type vacuum pump for a gas, comprising:
a hollow cylindrical stator;
a cylindrical rotor disposed in said stator with a gap therebetween;
a helical or thread groove formed on one of the inner peripheral surface of said stator and the outer peripheral surface of said rotor; and
means for rotating said rotor whereby evacuation is performed between a suction side and a discharge side of said pump,
wherein a width of said groove adjacent said suction side is larger than a width of a ridge between adjacent turns of said groove, and wherein said width of said groove adja-



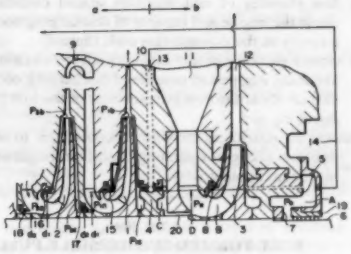
cent said suction side is from 0.8 to 0.95 times the sum of said width of said groove and said width of said ridge between adjacent turns of said groove, whereby a pressure gradient of the gas between said suction side and said discharge side is maximized for a wide range of flow rates of the gas.

4,708,587

CENTRIFUGAL COMPRESSOR

Kazuso Katayama; Taku Ichiryuu; Yasushi Mouri; Tsuneyoshi Mitsuhashi, and Masanori Kobayashi, all of Takasago, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 25, 1986, Ser. No. 832,680
Claims priority, application Japan, Jun. 20, 1985, 60-92283
Int. Cl.[4] F01D *3/04*
U.S. Cl. 415—104 **3 Claims**



1. A centrifugal compressor comprising:
a casing having a make-up stage and a recycle stage;
a shaft rotatably supported within said casing;
a make-up stage impeller fixedly mounted to said shaft for rotation, said make-up stage impeller being disposed within said make-up stage of said casing;
a recycle stage impeller fixedly mounted to said shaft for rotation, said recycle stage impeller being disposed within said recycle stage of said casing;
a first, balancing ring fixedly mounted to said shaft for rotation, said first balancing ring being disposed within said recycle stage of said casing;
a second balancing ring fixedly mounted to said shaft for rotation, said second balancing ring being disposed between said make-up stage and said recycle stage of said casing; and
a liner ring disposed between said recycle stage impeller and said recycle stage of said casing;
wherein diameters of said first balancing ring, said second balancing ring and said liner ring are substantially the same.

4,708,588

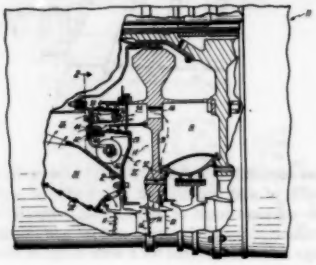
TURBINE COOLING AIR SUPPLY SYSTEM

Frederick M. Schwarz, Glastonbury, and James G. Griffin, West Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 14, 1984, Ser. No. 682,042

Int. Cl.[4] F04D *29/58*

U.S. Cl. 415—115 **4 Claims**



1. In a gas turbine engine of the type having coolable rotor blades and having means for the supply of cooling air to such blades including tangential on-board injectors fixed to the stator assembly of the engine between a source of cooling air and the engine rotor assembly for directing cooling flow against the rotor assembly in the direction of rotation of the rotor assembly and passages internally of the rotor assembly for directing flow subsequently to the rotor blades, wherein the improvement comprises means for varying the amount of cooling air to the rotor blade, including;

a first plurality of said injectors spaced circumferentially about the engine and capable of discharging cooling air to a cavity at the downstream ends thereof,

a second plurality of said injectors spaced circumferentially about the engine and capable of discharging cooling air to said cavity at the downstream ends of the first plurality of injectors, and

means for restricting the flow of cooling air to said second injectors at engine operating conditions requiring less than maximum cooling flow.

4,708,589

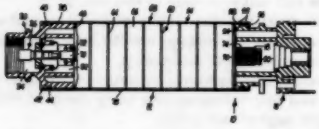
ROLL-FORMED SUBMERSIBLE PUMP

Darryl N. Nielsen, Lenexa, and Charles F. Wheeler, Olathe, both of Kans., assignors to The Marley-Wylain Company, Mission Woods, Kans.

Continuation of Ser. No. 778,127, Sep. 19, 1985, abandoned. This application Sep. 22, 1986, Ser. No. 910,806

Int. Cl.[4] F04D *29/22*

U.S. Cl. 415—199.2 **6 Claims**



1. The method of assembling a pump comprising the steps of:

providing a tubular casing having an inner, cylindrical surface with a diameter of a certain value;

positioning in substantial alignment and externally of said casing a plurality of pump stages in stacked relationship, each of said pump stages presenting a generally cylindrical outer wall having a diameter greater than said diameter of said inner surface of said casing before insertion of said stages in said casing;

placing said stack of pump stages in end-to-end relationship with one end of said casing; and

applying sufficient axial pressure to said stack of pump stages to forcibly insert under pressure the entire stack of pump stages in said casing,

said axial pressure being of a magnitude sufficient to overcome the interference fit relationship presented between said inner surface of said casing and each of said generally cylindrical outer walls across substantially the entire width of each of the latter,

said interference fit relationshsip thereafter causing said casing to maintain said pump stages in compression in directions radially inwardly of said stages in order to retain said stages in alignment and substantially preclude interstage leakage between said casing and said outer wall of each of said stages.

4,708,590

COVER FOR TURBINES AND PUMPS

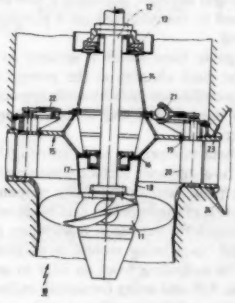
Helmut Bronowski, and Christian Dahlke, both of Heidenheim, Fed. Rep. of Germany, assignors to J.M. Voith GmbH, Fed. Rep. of Germany

Filed Jan. 16, 1986, Ser. No. 820,691

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1985, 3501883

Int. Cl.[4] F01D *25/28*

U.S. Cl. 415—219 C **14 Claims**



1. In a hydraulic machine of the type of a tubular (Kaplan) or propeller turbine or similarly shaped pump, the improvement comprising a cover for a fluid impeller therein,

said hydraulic machine comprising a rotatable shaft; a rotatable runner on the shaft which applies an axial force on the shaft in response to rotation of said runner; bearings on the shaft for supporting the shaft for rotation about an axis; and an outer covering around the shaft and the runner;

the cover being radially spaced from said shaft and annularly surrounding the shaft; and the bearings supporting the shaft being attached to the cover, whereby the cover supports the shaft;

the outer covering being disposed radially outwardly of the cover, the cover resting on the outer covering and being supported thereupon;

the cover comprising three flat rings which extend transversely of the shaft and are axially spaced apart, with a centeral most middle ring being the ring of largest diameter and extending to and resting on the outer covering; each of the outer rings being connected to a respective one of the supporting bearings for the shaft; the first outer ring being closer to the runner than the second outer ring;

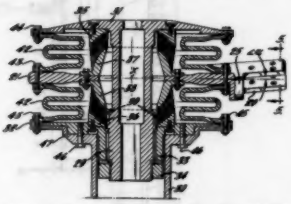
a first conical shell conically extending from a relatively smaller radius location on the first outer ring to the middle ring and presenting a surface which faces downwardly

toward said runner and outwardly away from said shaft; a second conical shell extending from the second outer ring and flaring conically wider to the middle ring.

4,708,591
BLADED AIRCRAFT ROTOR WITH FLEXIBLE BLADE MOUNTINGS

Stephan Roman, 81 Beardsley Rd., Shelton, Conn. 06484

Filed Jan. 15, 1986, Ser. No. 818,938
Int. Cl.[4] B64C *27/35, 27/52*
U.S. Cl. 416—102 **2 Claims**



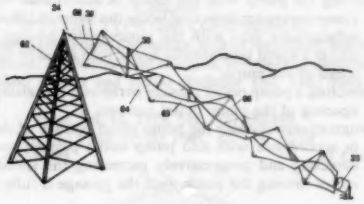
1. A bladed aircraft rotor comprising a rotative hub structure and a plurality of blades radiating from the hub structure, the hub structure including a driving shaft and a blade mounting ring surrounding the shaft, each blade having a flexible mounting strap connecting the blade with said mounting ring and providing freedom for flapping and pitch change motions of the blade with respect to the mounting ring, the driving shaft having means defining upper and lower bearing surfaces concavely spherically curved about a point on the axis of rotation of the hub structure, and the blade mounting ring having means defining upper and lower bearing surfaces convexly and concentrically curved about said point on the axis of rotation, flexible elastomeric means between the concentrically curved bearing surfaces for transmitting centrifugal thrust forces from the blade mounting straps to the hub structure while permitting blade motion substantially in a plane containing the axis of rotation of the hub structure, and means for transmitting torque force between the hub structure and the blades comprising flexible bellows above and below the blade mounting ring interconnecting the blade mounting ring with the drive shaft above and below the blade mounting ring, wherein the bellows serves mainly to drive the blades.

4,708,592
HELICOIDAL STRUCTURES, USEFUL AS WIND TURBINES

Robert S. Krolick, San Rafael; James S. Storey, South San Francisco, and Robin E. LeFever, Oakland, all of Calif., assignors to Wind Production Company, Millbrae, Calif.

Continuation of Ser. No. 723,196, Apr. 15, 1985, abandoned.
This application Oct. 28, 1986, Ser. No. 922,777
Int. Cl.[4] B64H *1/22*
U.S. Cl. 416—176 A **20 Claims**

1. A wind-responsive structure, comprising, in combination:
an elongated sheet of flexible material which is substantially impervious to the wind and which has oppositely-disposed ends,
bracing means attached to and extending throughout the length of said sheet, said bracing means being disposed on said sheet to permit said sheet to be collapsed into a folded compact condition and to position said sheet into a helical configuration upon the application of a pulling force to said oppositely disposed ends of said sheet, said bracing means comprising at least one elongated member, and

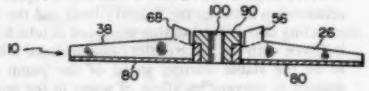


attachment means at said oppositely-disposed ends of said sheet for attaching said sheet to respective associated supporting structures.

4,708,593
SURGELESS COMBUSTION AIR BLOWER

H. Daniel Banyay, Zelienople, Pa., assignor to Robinson Industries, Inc., Zelienople, Pa.

Filed Feb. 28, 1986, Ser. No. 834,546
Int. Cl.[4] F04D *17/08*
U.S. Cl. 416—183 **5 Claims**



1. A surgeless impeller for use in a combustion air blower comprising:
a shroudless wheel having a disc-shaped web and a plurality of blades thereon;
each of said blades having a leading edge thereon opposite said discshaped web;
each of said blades further having one of a plurality of quadrangular inducers appended thereto at said leading edge thereof adjacent said hub, each of said quadrangular inducers further having the shape of a quadrilateral parallelogram;
each of said blades further having a tapered structure defined by a maximum chord immediately down-blade of the inducer of said blade and a minimum chord at the tip of said blade, wherein said leading edge of said blade defines a straight line between said inducer and said tip;
each of said blades further having an inducer-blade interface which is defined by a straight line having a slope which opposes the taper of said blade; and
each of said quadrangular inducers being bent at said inducer-blade interface about 45° into the direction of rotation of said impeller.

4,708,594
METHOD OF STARTING A VARIABLE-SPEED PUMP TURBINE OR A VARIABLE SPEED PUMP

Katsumasa Shinmei, and Kazuo Niikura, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 20, 1985, Ser. No. 811,744
Claims priority, application Japan, Dec. 21, 1984, 59-271612
Int. Cl.[4] F04B *49/00*
U.S. Cl. 417—53 **6 Claims**

1. A method of starting a variable-speed hydraulic rotary machine such as a pump for providing a delivery head and a flow rate, having valve means for varying the opening of a pump outlet passage, comprising:

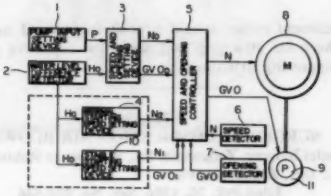
providing a variable speed motor connected to an electric powerline for driving the pump;

detecting a pump parameter correlated to the speed of at least one of the pump and the motor;

driving the pump with the motor in accordance with said pump parameter detecting while the hydraulic flow rate is substantially zero with the pump outlet passage closed, and at a speed substantially lower than a steady operation speed of the pump;

detecting a pump outlet passage parameter correlated to the opening of the pump outlet passage;

progressively opening the pump outlet passage of the pump in accordance with said pump outlet passage parameter detecting and progressively increasing the speed of the motor driving the pump until the passage is fully opened



and the steady operating condition of the pump is obtained;

maintaining the speed increasing with the increased opening of the pump outlet passage sufficient to have the pump delivery head always above a load curve representing the relationship between the delivery head and the flow rate;

conducting said driving so that the speed at which the pump is driven with the pump outlet passage closed is controlled to be the stable starting speed of the pump and high enough to prevent backflow of water in the pump outlet passage through the pump, wherein the stable starting speed of the pump is the speed at which the downward convexity of the head characteristic curve plotted against the pump flow rate has a value slightly above the load curve of the pump for static head.

4,708,595

INTERMITTENT OIL WELL GAS-LIFT APPARATUS

Timothy R. Maloney, Tarzana; David E. Patterson, Canoga Park, and Richard J. Aseltine, Rancho Palos Verdes, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Aug. 10, 1984, Ser. No. 640,076

Int. Cl.[4] F04F *1/20*; F21B *43/00*

U.S. Cl. 417—109 **10 Claims**

4. An intermittent gas-lift apparatus for lifting liquids, said apparatus comprising:

a production tube positioned within a casing wherein said casing has perforations adjacent a producing formation to provide a path of fluid communication between the formation and the interior of the casing;

means for sealing the production tube within the casing above said perforations therein;

a chamber connected to the downhole end of said production tube;

a valve for controlling the flow of fluid into the chamber connected to the opposite side of said chamber connected to said production tube;

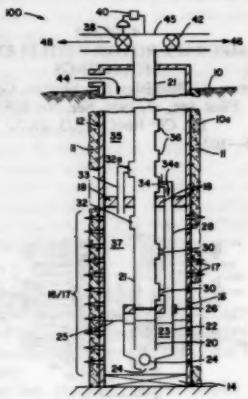
means for connecting said chamber with said production tube, above and below said means for sealing said production tube within said casing;

means for introducing a gas into the casing;

means for injecting said gas into said chamber within said means for connecting and above said means for sealing;

means for passing gas, located within said casing below said means for sealing;

means for reducing the pressure within said casing, said production tube and said chamber at the surface of said well so as to maximize the pressure drop between said formation and said chamber; and



means for separating the hydrocarbons produced therefrom at the surface of said well.

4,708,596

DEVICE FOR REGULATING PRESSURE AND DELIVERY OF AND ADJUSTABLE PUMP

Volker Palm, Nussdorf, and Berthold Pfuhl, Markgröningen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

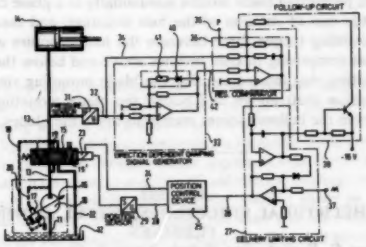
Continuation of Ser. No. 735,553, May 17, 1985, abandoned.

This application Jul. 28, 1986, Ser. No. 892,874

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1984, 3422089

Int. Cl.[4] F04B *49/00*

U.S. Cl. 417—218 **5 Claims**



1. A device for regulating pressure and delivery of an adjustable pump connected via a discharge conduit to a consumer and having a setting member which is adjustable by means of a setting piston, comprising an electrically operated multi-position directional control valve connected to said discharge conduit to continuously control in a working position thereof the flow of a pressure medium delivered by said pump; said directional control valve including a regulating passage; a control conduit leading to said setting piston and being connected via said regulating passage to a branch of said discharge conduit upstream of said directional control valve; means for sensing actual pressure in said discharge conduit downstream of said directional control valve; means for comparing the sensed actual pressure value with a desired pressure value to

produce a regulating difference signal; means for sensing actual position of the directional control valve; means for continuously controlling the actual working position of said directional control valve according to a control signal corresponding to a desired delivery value; and means for limiting said control singal in response to said regulating difference signal.

4,708,597

PLUNGER WITH SIMPLE RETENTION VALVE

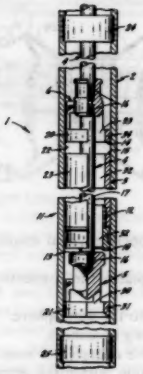
Amnon V. Fekete, Calle Chineborazo, Venezuela, assignor to Intevep, S.A., Caracas, Venezuela

Continuation-in-part of Ser. No. 427,158, Sep. 29, 1982, Pat. No. 4,591,316. This application May 23, 1986, Ser. No. 866,849

The portion of the term of this patent subsequent to May 27, 2003, has been disclaimed.

Int. Cl.[4] F04B *3/00, 7/00*

U.S. Cl. 417—259 **4 Claims**



1. A positive displacement retention valve apparatus in which the actual flow equals the theoretical maximum flow through the retention valve, said apparatus including, in combination,

a confined fluid flow conduit,

a piston adapted for reciprocal movement within the fluid flow conduit between upstream and downstream limit positions,

piston reciprocating means, and

pressure responsive check valve means located upstream with respect to the piston in the fluid flow conduit,

said pressure responsive check valve means operable to permit fluid flow therethrough in a downstream direction toward the piston, and to preclude fluid flow therethrough in an opposite direction,

said piston being composed of a plurality of parts which are relatively movable with respect to one another,

said piston including a simple retention valve consisting of a plug means, a cylinder having a minimum and a maximum internal cross section flow area therein and being reciprocal within the confined fluid flow conduit, and a seat on the cylinder for the plug means,

said piston reciprocating means having a wiper carried thereby located downstream from the cylinder which wipes the confined fluid flow conduit during compression movement of the piston reciprocating means,

said piston reciprocating means being operatively connected to the plug means,

said piston being arranged to close, and thereby block the fluid flow conduit, prior to the suction stroke of the piston,

the flow area between the plug means and the fluid flow conduit being equal to the flow area between the plunger reciprocating means and the minimum internal cross sectional flow area of the cylinder downstream from the cylinder seat whereby the flow through the piston is optimized.

4,708,598

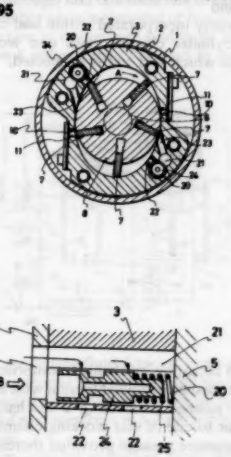
ROTARY TYPE GAS COMPRESSOR

Terumitsu Sugita; Hideo Shinozuka, both of Narashino, and Koji Murayama, Tatebayashi, all of Japan, assignors to Seiko Seiki Kabushiki Kaisha and Nihon Radiator Co., Ltd., both of, Japan

Filed Jul. 13, 1984, Ser. No. 630,599

Int. Cl.[4] F04B *49/00*; F04C *18/344, 29/08*

U.S. Cl. 417—295 **11 Claims**



1. In a rotary vane-type gas compressor having a cylinder defining a cylinder chamber, a rotor mounted to undergo rotation within the cylinder chamber and rotationally driven at varying speeds during use of the compressor, a plurality of slidable vanes slidably disposed in radial slots formed in the rotor such that the radial outer ends of the vanes make sliding contact with the cylinder chamber wall during rotation of the rotor, the vanes coacting with the rotor and cylinder chamber to define expansible working chambers between each two adjoining vanes for compressing gas in response to rotation of the rotor: gas admitting means for admitting gas to be compressed into the working chambers at a flow rate proportional to the speed of rotation of the rotor; gas discharging means for discharging compressed gas from the working chambers; and throttling means for throttling the flow of gas admitted into the working chambers in accordance with the flow rate of gas so as to reduce the mass of gas admitted into the working chambers during higher speeds of rotation of the rotor.

4,708,599

ROTARY COMPRESSOR APPARATUS

Akira Suzuki, Atsugi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 718,284, Apr. 1, 1985, abandoned. This application Mar. 19, 1986, Ser. No. 841,421

Claims priority, application Japan, May 25, 1984, 59-104513

Int. Cl.[4] F04B *49/00*

U.S. Cl. 417—295 **10 Claims**

1. A rotary compressor unit comprising:

a rotary compressor;

suction valve means for adjusting an amount of gas to be introduced into said compressor;

a piston-cylinder means for operating said suction valve means; and

and actuating mechanism for actuating said piston-cylinder means,

wherein said suction valve means comprises:

a casing provided therein with a gas passage, one end thereof communicating with a suction side of said compressor;

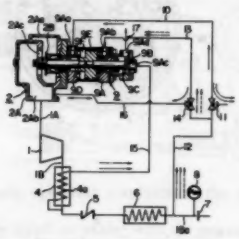
a valve element disposed movably in said gas passage to cooperate with a portion of said casing to adjust the amount of gas passing through said gas passage; and

a rod provided on one end thereof with said valve element,

wherein said piston-cylinder means comprises:

a cylinder; and

a piston movably incorporated within said cylinder so as to divide a cylinder chamber into two working chamber sections, to which said rod is connected,



wherein said actuating mechanism comprises:

an operation passage provided therein with a first valve, said operation passage connecting a discharge line of said compressor to one of said working chamber sections;

a negative pressure passage provided therein with a second valve, said negative pressure passage connecting a portion of said gas passage downstream side of said valve element of said suction valve means to the other working chamber section through two ports of said second valve; and

means for controlling said second valve to open said negative pressure passage after the compressor is started; and

wherein both said first and second valves are three-way solenoid valves, and a third port of said second valve is connected to said discharge line of said compressor.

4,708,600

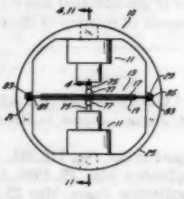
PIEZOELECTRIC FLUID PUMPING APPARATUS

David N. AbuJudom, II, 3220 Pilgrim Rd., Brookfield, Wis. 53005; Joseph P. Dougherty, 1601 Echo Valley Dr., Niles, Mich. 49120, and Kevin M. Stengel, 5295 N. Mohawk Ave., Glendale, Wis. 53217

Filed Feb. 24, 1986, Ser. No. 832,227

Int. Cl.[4] F04B *17/00, 35/00*

U.S. Cl. 417—322 **14 Claims**



1. A piezoelectric fluid pumping apparatus including:

pumping means, including a fluid inlet for filling said pumping means with fluid and a fluid outlet for supplying therethrough fluid under pressure, a pumping piston and means for operating said pumping piston;

an energizer arranged in driving relationship to said means for operating said pump piston of said pumping means and including a generally planar flexure member having first and second piezoelectric laminates supported thereon;

said flexure member including a first edge and a second edge, said edges being resiliently constrained for substantially preventing longitudinal movement thereof when an electrical signal is applied to said laminates.

4,708,601

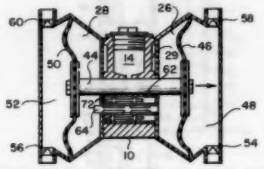
DUAL DIAPHRAGM PUMP

Alberto Bazan, 4928 Scott's Creek Trail, Duluth, Ga. 30136, and Donald M. Murphy, 739 Oak View Ct., Lilburn, Ga. 30093

Continuation-in-part of Ser. No. 626,915, Jul. 2, 1987, Pat. No. 4,566,867. This application Aug. 29, 1985, Ser. No. 770,420

Int. Cl.[4] F04B *43/06*

U.S. Cl. 417—393 **14 Claims**



1. A compressed air operated dual diaphragm pump comprising:

an inlet aperture adaptable for connection to a source of compressed air;

an air outlet aperture to the atmosphere;

two diaphragm pumping chambers;

an air distribution valve operable in response to the movement of the diaphragm within the pumping chambers to control the distribution of air to said pumping chambers, said air distribution valve comprising:

a housing having coaxial inner and outer cylindrical walls closed at both ends,

said outer wall including a longitudinally centered aperture in communication through said air inlet aperture with a source of compressed air, two longitudinally spaced apertures communicating respectively with said pumping chambers, and two longitudinally spaced apertures communicating with said outlet aperture, and

said inner wall being resiliently deformable under pressure and having three longitudinally spaced apertures;

a vale piston slidably mounted for reciprocating movement within said housing to connect;

when in a first position said longitudinally centered aperture with one of said pumping chamber apertures and the other of said pumping chamber apertures with one of said outlet aperture communicating apertures, and

when in a second position said longitudinally centered aperture with said other of said pumping chamber apertures and said one pumping chamber aperture with the other of said outlet aperture communicating apertures;

a pilot piston mounted for reciprocating motion within said inner wall in response to the expansion and contraction of said pumping chambers, said pilot piston configured to cooperate with the apertures in said inner wall to effect the reciprocation of said piston between said first and second positions and to permit the resilient deformation of said inner wall under pressure to bleed compressed air into position within said housing to reduce the pressure of differential maintaining the position of said valve member wherein the outer wall of said valve housing is metallic; and

wherein the ends of said valve housing are plastic;

wherein the inner wall is deformable at about sixty percent of the operating air pressure of said air distribution valve;

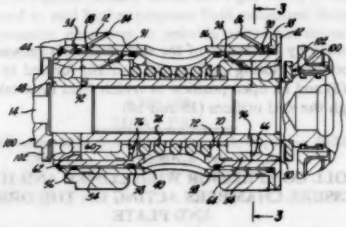
wherein said valve piston is plastic; and
wherein said pilot piston is metallic.

4,708,602

LUBRICATION SYSTEM FOR A TURBOCHARGER

J. Albert McEachern, Jr., Mobile, and J. William Brogdon, Daphne, both of Ala., assignors to Teledyne Industries, Inc., Los Angeles, Calif.

Continuation of Ser. No. 739,385, May 30, 1985, abandoned. This application Mar. 17, 1987, Ser. No. 27,079
Int. Cl.[4] F04B *17/00*; F16C *27/00*
U.S. Cl. 417—407 9 Claims



1. A turbocharger comprising:
a main housing having a throughbore,
a tubular bearing carrier having an outer periphery and an inner periphery, means for mounting said bearing carrier within said housing throughbore to permit limited radial movement of said bearing carrier with respect to said housing and to form at least one annular chamber between said bearing carrier and said housing,
a shaft extending through said bearing carrier, said shaft having a turbine mounted at one end and a compressor mounted at its other end,
at least one bearing assembly for rotatably connecting said shaft to the inner periphery of said bearing carrier,
a source of pressurized lubricant,
means for fluidly connecting said source to one axial end of said annular chamber,
fluid passage means formed through said bearing carrier for fluidly connecting the other axial end of said annular chamber to said bearing assembly, and
said annular chamber being dimensioned so that lubricant in said annular chamber hydrostatically damps said bearing carrier and so that said lubricant being supplied to said annular chamber acts to hydrostatically damp said bearing carrier, and then passes from said annular chamber and through said bearing carrier to said at least one bearing assembly to provide lubrication thereto.

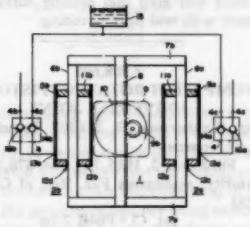
4,708,603

VARIABLE DISPLACEMENT PUMP

Chikanari Kubo, Sagamihara, Japan, assignor to Eishin Technology Company, Ltd., Japan

Filed Jun. 13, 1986, Ser. No. 873,955
Int. Cl.[4] F04B *17/00, 35/04*
U.S. Cl. 417—415 1 Claim

1. A variable displacement pump comprising, in combination:
(a) a cylinder member,
(b) a piston member slideably received in said cylinder member,
(c) said members having a common longitudinal axis,
(d) a rack rigidly connected to one of said members and extending parallel to said longitudinal axis,
(e) a pulse motor having an output shaft and with said motor being controllable to control the displacement of said pump,
(f) a pinion fixedly disposed on said shaft and in engagement with said rack to move the latter,
(g) one of said members having a single opening for alternate fluid entry into and discharge from said cylinder member,
(h) a common fluid line connected to said opening,
(i) said common line being connected to a first line portion for connection to an upstream fluid source,
(j) said common line being connected to a second line portion disposed in parallel with said first line portion for connection to a downstream system,
(k) first check valve means disposed in said first line portion for permitting fluid flow only in a direction from the fluid source and through said common line to said opening and cylinder member upon movement of one of said members in one direction in response to said pulse motor,
(l) second check valve means disposed in said second line



portion for permitting fluid flow only in a direction from said cylinder member and opening and through said common line toward said downstream system upon movement of said one of said members in a direction opposite to said one direction.
(m), said piston member extending from each end of said cylinder member,
(n) connecting members attached to the respective ends of said piston member,
(o) said rack having end portions attached to the respective connecting members to cause sliding movement of said piston member relative to said cylinder member,
(p) and said connecting members forming means for joining the piston member of said variable displacement pump to the piston member of a second said pump so that the piston members of both said pumps move unidirectionally upon movement of said rack.

4,708,604

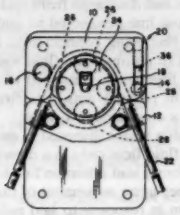
PRESSURE SURFACE FOR A PERISTALTIC PUMP

Edward H. Kidera, Bristol, Wis., assignor to Abbott Laboratories, North Chicago, Ill.

Continuation of Ser. No. 817,793, Jan. 9, 1986, abandoned, which is a continuation of Ser. No. 638,597, Aug. 7, 1984, abandoned. This application Sep. 12, 1986, Ser. No. 906,666
Int. Cl.[4] F04B *43/12, 45/08*
U.S. Cl. 417—477 1 Claim

1. A peristaltic pump comprising:
a length of flexible tubing:
a rotatable pump head having a plurality of pressure wheels constructed and arranged for repetitive and successive compression of said flexible tubing;
a plate member having an arcuate surface against which said flexible tubing may be compressed by said pressure wheels;
a mechanical spring operatively associated with said plate member to retain said plate member in an open position;
a pivot member operatively associated with said plate member to position said plate member with respect to said rotatable pump head and said flexible tubing; and
means for resiliently biasing said arcuate surface against said compressible tubing;

whereby when said plate member is rotated on said pivot member into a position for operative engagement with



said flexible tubing, said means for resiliently biasing said pump head will hold said arcuate surface in operative engagement with said flexible tubing.

4,708,605

PISTON PUMP WITH ROTATING PISTON HAVING A UNIVERSAL JOINT

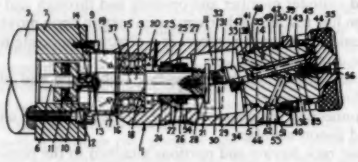
Franz Orlita, Waldstrasse 33, D-6305 Buseck-Alten Buseck, Fed. Rep. of Germany

Filed Jun. 2, 1986, Ser. No. 870,127

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1985, 3520233

Int. Cl.[4] F04B *7/06*

U.S. Cl. 417—500 **11 Claims**



1. In a piston pump comprising a rotating piston, which is movable back and forth in a cylinder bore, and comprising a rotating crank, to which said piston is connected hingedly, whereby a piston axis and an axis of rotation of said crank intersect one another and said crank and said piston are coupled drivably with one another and wherein a joint has rolling surfaces, which are provided on said crank and on said piston, the improvement comprising wherein said rolling surfaces on said crank and said piston are constructed as troughs and wherein a convex rolling member is received in said troughs, said rolling member having a surface curvature which is greater than the curvature of the trough surfaces, whereby the edges of said troughs are oriented such that during all relative positions between said troughs, the trough edges do not contact one another and in peripheral direction of the rotating movement there exists a form-closed engagement between said troughs and said rolling member and forces can be transmitted through said rolling member in direction of the pressure stroke.

4,708,606

VALVE, PARTICULARLY FOR AIR COMPRESSOR

Paolo Zambelli, Casalecchio di Reno, Italy, assignor to Fini Elettrocostruzioni Meccaniche, S.p.A., Zola Predosa, Italy

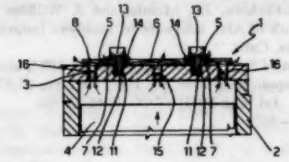
Filed Apr. 20, 1987, Ser. No. 39,975

Claims priority, application Italy, Apr. 28, 1986, 3401 A/86

Int. Cl.[4] F04B *21/00*; F16K *21/04*

U.S. Cl. 417—559 **10 Claims**

1. A valve of improved type, in particular for air compressors, wherein it comprises a strip in which are formed two first substantially U-shape slots (5) facing one another, which define a central portion (6) situated between the said first slots (5), two intermediate portions situated to the sides of the said central portion (6) and constituted by a respective tongue (7) fixed to a valve carrier plate (3) closing a cylinder (2) within which translates a piston (4), and a perimetral portion (8); at least the said perimetral portion (8) being able to translate



alternately by the action of the said piston (4) between a closure position closing orifices (15 and 16) formed in the said plate (3) and an open position in which fluid flow takes place through the said orifices (15 and 16)

4,708,607

SCROLL COMPRESSOR WITH LOWER AND HIGHER PRESSURE CHAMBERS ACTING ON THE ORBITING END PLATE

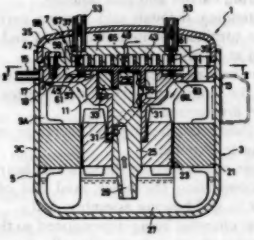
Makoto Hayano; Shigemi Nagatomo, both of Tokyo; Hirotsugu Sakata, Chigasaki; Mitsuo Hatori, Yokohama, and Hitoshi Hattori, Yokosuka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 725,332, Apr. 19, 1985, abandoned. This application Dec. 18, 1986, Ser. No. 942,916

Claims priority, application Japan, Jul. 20, 1984, 59-150817

Int. Cl.[4] F04C *18/04*

U.S. Cl. 418—55 **7 Claims**



1. A scroll compressor comprising:

a sealed vessel;

a frame disposed inside said sealed vessel to rotatably support a rotating shaft and to partition the interior of the sealed vessel into a drive chamber and a compression device chamber;

a stationary end plate which has an outer wall, a first scroll wrap on the inside of said outer wall, and a means for tightly fixing said stationary end plate to said frame inside said pressure vessel;

an orbiting end plate having a first surface thereof connected to a rotating shaft, and a second scroll wrap which is slidable against said first scroll wrap at a plurality of places so as to form compression chambers between said stationary end plate and a second surface opposite to said first surface of the orbiting end plate;

an Oldham's ring operatively disposed between said orbiting end plate and said frame;

said frame formed with a rigid annular frame portion for slidably supporting said orbiting end plate on said first surface thereof such that said rigid annular frame portion seals the space radially inside said rigid frame portion from that radially outside said rigid frame portion, said

rigid frame portion disposed radially inside of said Oldham's ring and extending axially so as to limit axial loading upon said Oldham's ring from said orbiting plate;

said stationary end plate formed with a suction port at a relatively outer periphery portion thereof corresponding to the outermost part of said compression chambers and a discharge port substantially in the center thereof;

and means for communicating higher pressure fluid exhausted from said compression chambers to said space radially inside said rigid frame portion;

wherein fluid entering said suction port is compressed in said compressor chambers to a higher pressure as said orbiting scroll rotates, and said first surface of said orbiting end plate, in a space radially inside said rigid frame portion, is exposed to said higher pressure fluid exhausted from said compression chambers to provide additional support to said orbiting plate.

4,708,608

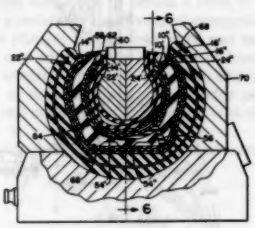
HEAT PAD

Jobbie DiRocco, 3424 Sweetbriar Ave., Akron, Ohio 44321

Filed Jun. 17, 1986, Ser. No. 875,088

Int. Cl.[4] B29C *35/02*

U.S. Cl. 425—14 **12 Claims**



1. A heat pad for pressing against a curved surface of an annular tire to vulcanize a tire patch comprising a channel-shaped sheet member of resilient conductive rubber material having spaced-apart elongated side edges and U-shaped end edges, a first electrode adhered to said sheet member at a position adjacent one of said side edges, a second electrode adhered to said sheet member at a position adjacent the other of said side edges, a cover member of resilient insulating rubber material encasing said sheet member of resilient conductive rubber material having side edges spaced outwardly of said elongated side edges of said U-shaped end edges of said sheet member and said cover member having U-shaped end edges spaced outwardly of said end edges of said sheet member, said cover member further comprising a first layer and a second layer of resilient insulating rubber material having edges coincident with said side edges and U-shaped end edges of said cover member, said first layer overlapping and being adhered to a first side of said sheet member of resilient conductive rubber material, said second layer overlapping and being adhered to a second side opposite said first side of said sheet member and being adhered to overlapped portions of said first layer of resilient insulating rubber material, and wires positioned between said first layer and said second layer in said overlapped portions at the U-shaped end edges of said insulating rubber material, said wires connecting said first electrode and said second electrode to a source of electricity to heat said sheet member of resilient conductive rubber material, said heat pad having an intermediate portion between said first electrode and said second electrode for pressing against said curved surface of said annular tire and said intermediate portion being stretchable in a direction radially of said tire and in a direction circumferentially of said tire to conform to said curved surface of said tire under pressure from a pressing member urging said heat pad against said tire.

4,708,609

TIRE MANUFACTURING MOLD

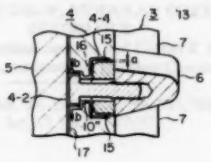
Yasutada Yoda; Seisuke Sueyasu, both of Higashimurayama, and Shoji Futamura, Kawasaki, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Mar. 20, 1985, Ser. No. 713,951

Claims priority, application Japan, Mar. 22, 1984, 59-55085; Apr. 24, 1984, 59-82412; May 2, 1984, 59-89095; May 2, 1984, 59-89096; May 2, 1984, 59-89097

Int. Cl.[4] B29C *33/10*

U.S. Cl. 425—28 D **7 Claims**



1. A tire manufacturing mold comprising a profile ring having a contour surface corresponding to the outer profile of a tire being molded, including at least the tread surface thereof, and a net ring having a faying surface for making contact with said profile ring contour surface and consisting of ribs and/or lugs for forming the grooves of said tire being molded, said net ring having an outer surface which include no portion of an inner circumferential surface of said profile ring said, profile ring having gas vent members detachably embedded on said profile ring contour surface at locations relative to said net ring and comprising a part of said profile ring contour surface; gas vent gaps being formed on the periphery of said gas vent members; part of said gas vent members on the periphery thereof being covered by said net ring faying surface; and said gas vent gaps on the periphery of said gas vent members not covered by said net ring faying surface constituting part of gas vent members facing to the back side of said profile ring.

4,708,610

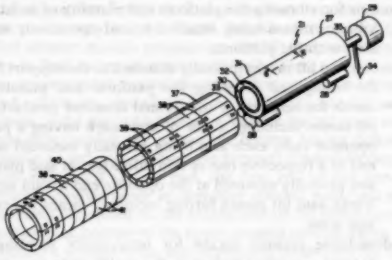
APPARATUS FOR MAKING AN ENDLESS POWER TRANSMISSION BELT

Paul M. Standley, Springfield, Mo., assignor to Dayco Products, Inc., Dayton, Ohio

Continuation of Ser. No. 871,022, Jun. 5, 1986, abandoned, which is a continuation of Ser. No. 683,087, Dec. 18, 1984, abandoned, which is a division of Ser. No. 367,520, Apr. 12, 1982, Pat. No. 4,511,521. This application Mar. 10, 1987, Ser. No. 23,951

Int. Cl.[4] B29C *41/04*

U.S. Cl. 425—28 B **9 Claims**



1. In an apparatus for making an endless power transmission belt construction or the like formed of material that is mainly

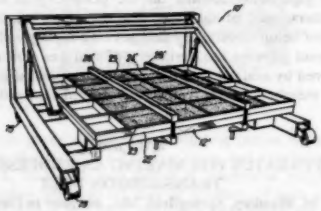
polymeric material and that has been cut from an annular belt sleeve and comprises a tension section, a compression section, and a load-carrying section disposed intermediate said tension section and said compression section, said apparatus having means for orienting at least part of the material of at least one of said sections, the improvement wherein said means for orienting said part of said material comprises means for imposing the force of field line means thereon while said material is in liquid form and is in the belt sleeve form thereof.

4,708,611

APPARATUS FOR CASTING AND INVERTING CONCRETE PRODUCTS

Harold L. Bouteiller, 32 Broughton Crescent, Red Deer, Canada T4N 1C8

Filed Apr. 2, 1986, Ser. No. 847,209
Int. Cl.[4] B28B 7/08
U.S. Cl. 425—62 14 Claims



1. An apparatus for making a plurality of molded concrete products comprising:

a support frame;

a platform having two side edges, a front and back edge, and a top and bottom surface;

a plurality of molds situated on the top surface of the platform, each mold having a cavity defined by side walls and a bottom for receiving concrete;

means for vibrating the platform and plurality of molds, the vibrator means being attached to and operatively associated with the platform;

motorized lift means pivotally attached to the support frame for lifting and inverting the platform and plurality of molds for removal of the formed concrete product, said lift means including a pair of arms each having a pair of opposite ends, each arm being pivotally mounted at one end to a respective one of said side edges of said platform and pivotally mounted at the opposite end to said support frame, said lift means further including means for raising said arms;

detachable retainer means for temporarily securing the formed concrete product in the molds prior to removal, when the platform is in its inverted position; and

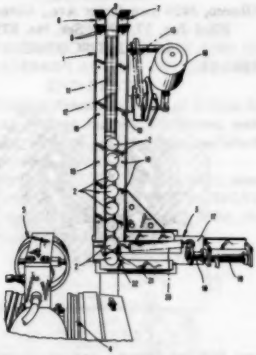
control means attached to the support frame for actuating the vibrator and lift means.

4,708,612

APPARATUS FOR INTRODUCING TRANSPORT ANCHORS INTO A MOLD FOR CONCRETE PARTS

Harald Pape, Detmold, Fed. Rep. of Germany, assignor to Deha Baubedarf GmbH & Co. KG, Gross-Gerau, Fed. Rep. of Germany

PCT No. PCT/EP85/00127, § 371 Date Dec. 2, 1985, § 102(e) Date Dec. 2, 1985, PCT Pub. No. WO85/04360, PCT Pub. Date Oct. 10, 1985
PCT Filed Mar. 23, 1985, Ser. No. 809,920
Claims priority, application Fed. Rep. of Germany, Mar. 30, 1984, 8409825[U]
Int. Cl.[4] B29C 23/00
U.S. Cl. 425—117 20 Claims



1. Apparatus for inserting transportation anchors into a casting mold for forming concrete parts such as concrete pipes, said apparatus comprising:

a magazine for storing a plurality of anchors and including an outlet at which one of said anchors is disposed,

an output mechanism for moving said one anchor from said outlet to an extended position in a first direction perpendicular to a longitudinal axis of said one anchor,

a sled movable forwardly toward said casting mold in a second direction which is perpendicular to said first direction and parallel to said longitudinal axis of said one anchor disposed in said extended position, and

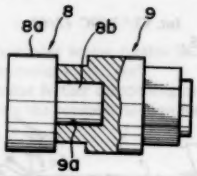
a gripper carried by said sled and positioned in alignment with said one anchor disposed in said extended position, said gripper being arranged to grip a first longitudinal end of said one anchor and transport said one anchor from said extended position to a terminal position at said casting mold as said sled is moved forwardly in said second direction, said gripper gripping said first longitudinal end such that said one anchor extends forwardly in said second direction.

2. Apparatus according to claim 1, including said casting mold which includes an opening into which the front ends of said jaws can travel, a sealing surrounding said opening to seal around said jaws and enable concrete to be poured into said casting mold with an anchor positioned therein by said jaws.

4,708,613
PLUNGER FOR A MULTI-PLUNGER TYPE RESIN MOLD DEVICE

Michitoshi Sera, Yokohama; Mitukazu Watanabe, Noogata, and Kiyoshi Aoki, Ayase, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 27, 1986, Ser. No. 833,597
Claims priority, application Japan, Mar. 27, 1985, 60-60990; Apr. 26, 1985, 60-89043
Int. Cl.[4] B29C 45/02, 45/53
U.S. Cl. 425—117 8 Claims



1. In a plunger type resin molding device having a plunger slidably inserted into a pot to permit a resin in the pot to be supplied into a mold, the improvement comprising:

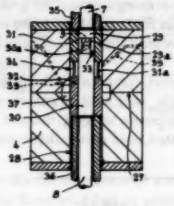
at least one plunger having a forward end member with a forward end edge portion made of at least one kind of material selected from silicon nitride, silicon carbide and zirconia, at least said forward end edge portion of said forward end member being in contact with the resin in the pot; and

a plunger body to which said forward end member is removably fixed.

4,708,614
INJECTION MOLDS FOR THE MANUFACTURE OF COMPOSITE BODIES

Jacques Schomblond, Montagnieu, France, assignor to Cartier Industrie, Thyez, France

Filed Mar. 20, 1986, Ser. No. 841,967
Claims priority, application France, Mar. 22, 1985, 85 04518
Int. Cl.[4] B29C 39/12, 45/16, 45/22, 45/32
U.S. Cl. 425—120 11 Claims

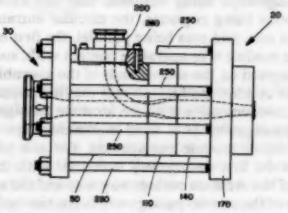


1. An apparatus for molding composite bodies having at least two concentric sections formed of separated moldable materials comprising a molding block having a bore extending therethrough, a first cavity formed in said molding block so as to be in encircling relationship with said bore, a first injector means for introducing a moldable material into said first cavity, a pair of opposing core members axially aligned within said bore, first means for moving said opposing core members axially within said bore, each of said core members having body portions and end portions, said end portions being of reduced dimension and being in opposing and aligned relationship with respect to one another, a second cavity formed around said end portions of said core members and between said body portions thereof when said end portions are in contacting relationship to one another, second injector means for introducing a moldable material into said second cavity, said second injector means being positioned remotely from said first cavity whereby a first section of the composite body is formed in said second cavity and thereafter said core members are moved so as to align said second cavity having the first section therein with said first cavity and thereafter introducing another moldable material into said first cavity through said first injector means to form a second section of the composite body which is concentric with the first section.

4,708,615
LOW PRESSURE DROP, MODULAR COEXTRUSION FEEDBLOCK

James R. Bethea, Denham Springs, and Clifton T. Knight, Baton Rouge, both of La., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 29, 1986, Ser. No. 924,705
Int. Cl.[4] B29C 47/12
U.S. Cl. 425—131.1 10 Claims



1. A modular coextrusion apparatus for preparing laminates of thermoplastic materials, the apparatus comprising:

a. a first adapter module having defined therein a passageway adapted to receive a first heat-plastified thermoplastic polymer stream, said module having a first end and a second end which are spaced apart and generally parallel and planar, the passageway having an entrance proximate to the first end of the module and an exit proximate to the second end of the module, the exit having an axis;

b. a lower conduit module having a first end and a second end which are spaced apart and generally parallel and planar, and a top and a bottom which are spaced apart and generally coplanar, the module having defined therein a passageway adapted to receive the first heat plastified stream and having an entrance, an exit and an axis, the top having defined therein an arcurate channel which has a first end and a second end, the exit of the passageway and the second end of the channel terminating at the second end of the module, the first end of the lower conduit module being in operative contact with, and removably connected to, the second end of the first adapter module and aligned so that (1) the axis of the lower conduit module passageway is coaxial with the axis of the exit of the first adapter module passageway and (2) the passageways are in fluid communication with each other;

c. an upper conduit module having a first end and a second end which are spaced apart and generally parallel and planar, and a top and a bottom which are spaced apart and generally parallel and planar, the bottom having defined therein an arcurate channel, the arcurate channel having a first end and a second end, the first end of the upper conduit module being in operative contact with, and removably connected to, the second end of the first adapter module, the bottom of the upper conduit module being in operative contact with, and removably connected to, the top of the lower conduit module and aligned so as to form an arcurate passageway having an exit formed by the second ends of the arcurate channels and an entrance formed by the first ends of the arcurate channels, the exit

having an axis which is parallel to the axis of the lower module passageway, the entrance having an axis which is generally perpendicular to the axis of the exit.

d. a second adapter module having defined therein a passageway adapted to receive a second heat-plastified thermoplastic polymer stream, said adapter module having a first end and a second end which are spaced apart and generally parallel and planar, the passageway having an entrance proximate to the first end of the module and an exit proximate to the second end of the module, the exit having an axis, the second adapter module being in operative contact with, and removably connected to, the assembled upper and lower conduit modules so that the second adapter module passageway and the arcurate passageway way are in fluid communication with each other and the axis of the second adapter module exit is coaxial with the axis of the entrance of the arcurate passageway;

e. a transition module having a first end and a second end, the module having defined therein a first passageway and a second passageway, each of which has a circular entrance and a generally rectangular exit, the entrances of said passageways being coplanar and the exits of said passageways being coplanar, the circular entrances each having an axis, said axes being parallel, the first end of the transition module is in operative contact with, and removably connected to, the second ends of the assembled upper and lower conduit modules so that the first passageway is in fluid communication with the arcurate passageway, the second passageway is in fluid communication with the lower conduit module passageway, the axis of the entrance of the first passageway is coaxial with the axis of the exit of the arcurate passageway way and the axis of the entrance of the second passageway is coaxial with the axis of the lower conduit module passageway;

f. a flow rate modifying module having a first end and a second end, the module having defined therein a first generally rectangular passageway adapted to receive the second heat-plastified stream from the generally rectangular exit of the first passageway of the transition module and a generally rectangular divided passageway adapted to receive the first heat-plastified stream from the generally rectangular exit of the second passageway of the transition module, each of said rectangular passageways beginning with an entrance proximate to the first end of the module and ending in a combined exit proximate to the second end of the module, the divided passageway being subdivided into at least two parallel passageways of generally equal cross section, the second end of the transition module and the first end of the flow rate modifying module being (1) in operative contact with, and removably connected to, each other and (2) aligned so that the first rectangular passageway is in fluid communication with the first passageway of the transition module and the rectangular divided passageway is in fluid communication with the second passageway of the transition module; and

g. a combining and transition module having a first end and a second end which are spaced apart and generally parallel and planar, said module having defined therein a passageway which has a generally rectangular entrance adapted to receive heat-plastified polymer from the combined exit of the flow rate modifying module and a circular exit, the first end of the combining and transition module being in operative contact with, and removably connected to, the second end of the flow rate modifying module and aligned so that the entrance is in fluid communication with the combined exit of the flow rate modifying module;

h. a plurality of external fastening means which hold the first adapter module, the combined upper and lower conduit modules, the transition module, the flow rate modifying module and the combining and transition module in position with respect to each other and apply an amount of compressive force upon the modules, the compressive force, in conjunction with a sealing surface diameter sufficiently large to minimize joint rotation between adjacent blocks and a seal relief area sufficient to minimize a counteracting force generated by leaking or migrating polymer, providing sufficient sealing stress to achieve a generally leak-free seal between adjacent modules.

4,708,616

EXTRUSION APPARATUS FOR MANUFACTURING FOIL OUT OF PLASTIC

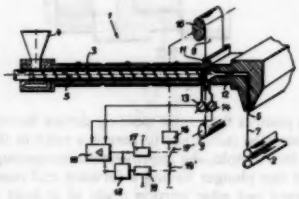
Franz X. Hüemer, Sonnenuhrgasse 4, 1060 Vienna, Austria

Filed Apr. 30, 1986, Ser. No. 858,939

Claims priority, application Switzerland, May 9, 1985, 01964/85

Int. Cl.[4] B29C *47/68*

U.S. Cl. 425—133.5 **1 Claim**



1. An extrusion apparatus for manufacturing foil out of plastic, in particular for the subsequent processing thereof into interweavable, narrow, slit-foil tapes, said apparatus comprising:

a cylinder in which granulated plastic is heated to soften said plastic;

a fishtail die downstream from and adjacent to said cylinder, said heated plastic being conveyed through said cylinder by a conveyor means to said die;

a filter band displaceably situated at right angles to a longitudinal extension of said fishtail die, said band having a width of at least approximately an inlet-side width of said fishtail die;

at least one pressure sensing element for generating a control signal to move said filter band, said one or more elements situated in a conveying direction of said heated soft plastic;

a time-dependent short circuit switching unit assigned to a switching network, said unit upon receiving a control signal from said pressure sensing element causing a motor drive to be activated, said drive displaceably moving said filter band.

4,708,617

SCREW EXTRUDER WITH A ROTATABLE BARREL SECTION

Fox J. Herrington, Holcomb, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 6, 1986, Ser. No. 871,332

Int. Cl.[4] B29C *47/00*

U.S. Cl. 425—135 **17 Claims**

1. A screw extruder comprising:

a longitudinally extending barrel including

(i) a feed section for receiving a plastic material, and

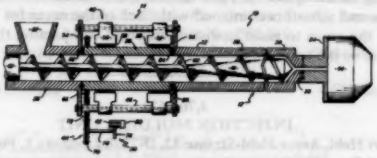
(ii) an outlet to discharge the plastic material from the barrel; and

an extruder screw rotatably supported in the barrel to rotate and to advance the plastic material therethrough;

the barrel further including a rotatable section located for-

ward of the feed section to receive the plastic material therefrom, and supported for rotation relative to the feed section and about the extruder screw, and wherein rotation of the extruder screw rotates the rotatable section around the extruder screw; and

the screw extruder further comprising means connected to and supporting the rotatable section for said rotation



4,708,618

EXTRUDER DIE FOR EXTRUSION OF A THERMOPLASTIC LAMINATE

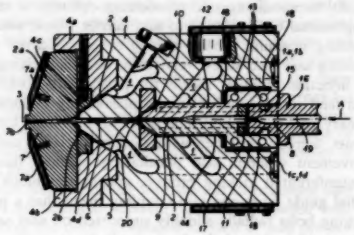
Hans Reifenhäuser, Troisdorf; Paul Reitemeyer, Troisdorf-Bergheim; Klemens Krumm, Neunkirchen-Seelscheid, and Heinz Beisemann, Porz-Lind, all of Fed. Rep. of Germany, assignors to Reifenhauser GmbH & Co. Maschinenfabrik, Troisdorf, Fed. Rep. of Germany

Filed Nov. 7, 1986, Ser. No. 929,077

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1985, 3539767; Jan. 9, 1986, 3600396

Int. Cl.[4] B29C *47/78*

U.S. Cl. 425—133.5 **8 Claims**



1. An extruder die for extrusion of a multilayer thermoplastic laminate in the form of a foil or plate, comprising:

a multicomponent block having a plurality of feed channels with distributing channels connected thereto for forming the layers of said multilayer thermoplastic laminate and a central distributor channel connected to said feed channels and said distributing channels;

an output die connected to said central distributor channel and mounted on said multicomponent block; and

a cartridge mounted in a cartridge receptacle in said multicomponent block having a shaft member and an enlarged head piece and said cartridge containing an additional feed channel for feeding in a special plastic material for said thermoplastic laminate, a plurality of feed ducts for providing a coating plastic material to said special plastic material and a plurality of tempering passages distributed over the periphery and length of the cartridge.

4,708,619

APPARATUS FOR SPINNING MONOFILAMENTS

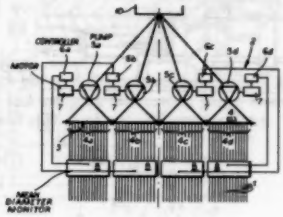
Hermann Balk, Troisdorf, Fed. Rep. of Germany, assignor to Reifenhauser GmbH & Co. Maschinenfabrik, Troisdorf, Fed. Rep. of Germany

Filed Feb. 27, 1986, Ser. No. 834,626

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1985, 3506924

Int. Cl.[4] D01D *1/09*

U.S. Cl. 425—141 **6 Claims**



1. An apparatus for spinning monofilaments from a thermoplastic synthetic resin which comprises:

a spinning head formed with a plurality of spinnerets each having a group of nozzle orifices, said spinnerets being fewer in number than the total number of orifices;

a respective pump connected to each of said spinnerets for feeding said synthetic resin to the nozzle orifices of the respective group;

a respective electric motor for driving the pump of each spinneret;

a respective diameter measuring unit positioned adjacent to each spinneret and located downstream of said orifices for monitoring the diameter of each mono-individual filament issuing from the orifices and means for providing an actual value signal representing an average of the diameters of monofilament monitored by said unit; and

a respective controller connected to said unit and responsive to the respective actual value, and connected to the respective motor to control the pump of the respective spinneret to maintain the average value signal substantially constant.

4,708,620

MACHINE FOR MOLDING ARTICLES BY INJECTION MOLDING OR DIE CASTING

Werner Brugger, Niederuzwil, Switzerland, assignor to Gebruder Buhler AG, Uzwil, Switzerland

Continuation-in-part of Ser. No. 724,614, Apr. 18, 1985, Pat. No. 4,600,374. This application Apr. 25, 1986, Ser. No. 856,048

Claims priority, application Fed. Rep. of Germany, May 10, 1984, 3417293

The portion of the term of this patent subsequent to Jul. 15, 2003, has been disclaimed.

Int. Cl.[4] B29C *43/58*

U.S. Cl. 425—154 **24 Claims**

1. Apparatus for molding articles from a molding material, comprising:

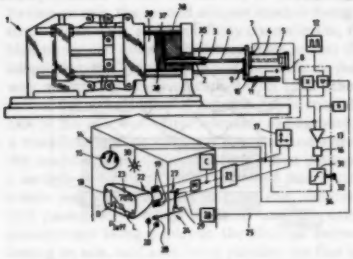
mold means defining a cavity and having a predetermined characteristic to be expressed in a diagram as a mold resistance line;

injection sleeve means of hollow cross-section and a predetermined maximum volume connected in fluid communication with the mold cavity, said sleeve means having a supply opening for the supply of molding material to the hollow interior of said injection sleeve means for discharge under pressure into said cavity;

injection ram means, including a piston, slidable axially within said hollow injection sleeve means;

drive means for moving said injection ram means within said injection sleeve means, said drive means determining the shot pressure of said molding material, the volumetric flow rate of which depends upon the velocity of said injection ram means within said injection sleeve means;

means for sensing the shot pressure of said drive means, and generating a first output signal respresentative of the differential pressure across the piston of said injection ram means;



means for sensing the velocity of said injection ram means and for generating a second output signal representative thereof;

calculating means for receiving said first and second output signals, calculating the actual injection power of the machine as a function of the differential pressure and the volumetric flowrate of molding material into the mold cavity, and generating a third output signal representative of the actual injection power; and

evaluating means for evaluating said third output signal.

4,708,621

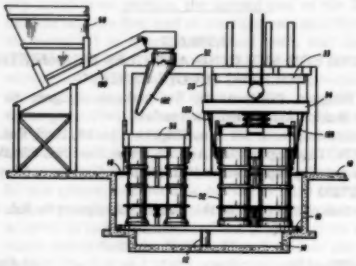
CONCRETE PIPE MAKING MACHINE

Hartzell H. Schmidgall, and Jon A. Schmidgall, both of Mediapolis, Iowa, assignors to Hawkeye Concrete Products Co., Mediapolis, Iowa

Filed Dec. 27, 1985, Ser. No. 813,844

Int. Cl.[4] B28B *21/16, 21/24*

U.S. Cl. 425—183 **7 Claims**



1. In an apparatus for producing concrete pipe using form sets and having a fill station, a pressure head station, a stripping station and turnable means for supporting form sets and moving them successively from station to station, a module having at least two form sets coupled together, said module comprising a supporting base, at least two cores supported on the base, means to position the cores on the base, vibration isolation means between the cores and base to provide for limited relative movement of the cores relative to the base, a jacket positionable over each core to define a space in which the concrete is to be filled to form a finished pipe or the like, connecting means for connecting all jackets in a module together so that the jackets can be handled as a unit, said connecting means including a feed pan connecting the jackets at their upper ends and to receive the concrete at the fill station, movable distributing means in the feed pan to feed the concrete into the form sets, and vibrators combined with each of the cores for vibrating the cores to assist in distributing and compacting the concrete in the form sets.

4,708,622

INJECTION MOLDING UNIT

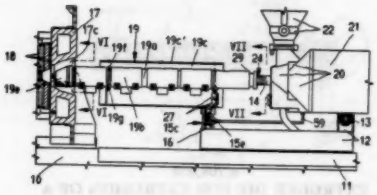
Karl Hehl, Artur-Hehl-Strasse 32, D-7298 Lossburg 1, Fed. Rep. of Germany

Filed Apr. 15, 1986, Ser. No. 852,338

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1985, 3513411; Jul. 26, 1985, 3526710

Int. Cl.[4] B29C *45/54*

U.S. Cl. 425—185 **21 Claims**



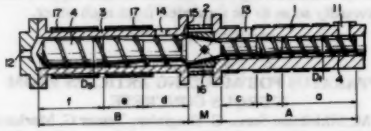
1. In an injection molding machine including an injection mold assembly, an injection molding unit, a first drive means for inserting the injection molding unit on and withdrawing it from said injection mold assembly; said injection molding unit including a carrier block having a central longitudinal bore, a plasticizing cylinder normally projecting into said central longitudinal bore and having a longitudinal axis, a feed screw coaxially received in said plasticizing cylinder and being arranged for a rotary motion and an axial shifting motion relative to said plasticizing cylinder, coupling means for releasably axially immobilizing said plasticizing cylinder in said central longitudinal bore relative to said carrier block; said injection molding machine further having a second drive means for rotating said feed screw relative to said plasticizing cylinder, an injection cylinder means for periodically axially shifting said feed screw relative to said plasticizing cylinder and stationary columns supporting said carrier block for displacements thereon together with said plasticizing unit; the improvement wherein said plasticizing cylinder has an outer circumferential locking groove, said carrier block has inner radial guide faces and said coupling means has a plurality of locking bolts radially slidably supported on said radial guide faces; said locking bolts having a locking position in which they project into said circumferential locking groove and an unlocking position in which said locking bolts are radially withdrawn from said circumferential locking groove, a third drive means operatively connected with said locking bolt for causing radial movement thereof into the locking or unlocking positions; a fourth drive means being operatively connected to said plasticizing cylinder for moving said plasticizing cylinder out of said carrier block in the course of an axial releasing stroke of said fourth drive means and while said locking bolts are in said unlocking position; the improvement further comprising a stationarily held support component arranged for supporting said plasticizing cylinder after removal thereof from said carrier block by said fourth drive means; and a stationarily supported stopping device arranged to be brought into an abutting engagement with said plasticizing cylinder externally of said carrier block for stopping said plasticizing cylinder when being withdrawn from said injection mold assembly by said first drive means.

4,708,623

APPARATUS FOR PRODUCING ORGANIC FILLER-BLENDED RESIN COMPOSITIONS

Kazuo Aoki, Chibashi, and Tsutomu Moteki, Sodegauramachi, both of Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Mar. 12, 1984, Ser. No. 588,310
Claims priority, application Japan, Mar. 14, 1983, 58-41748
Int. Cl.[4] B29C 47/64, 47/76
U.S. Cl. 425—202 **4 Claims**



1. An apparatus for receiving and extruding an admixture of a thermoplastic resin and a fiber-rich, roughly-divided organic filler raw material which comprises

(a) a first material feeding and plasticizing section that is composed of an elongated cylinder and a screw that is adapted to rotate within the cylinder so as to leave a gap distance therebetween,

(b) an inlet to said first section for introducing said resin and said filler,

(c) a fibers-disentangling and kneading second section following said first section,

(d) an extruding and metering third section that follows said second section, said third section including an elongated cylinder and a screw that is adapted to rotate therein so as to leave a gap distance therebetween,

(e) an outlet for extrudate from said third section,

(f) a vent outlet located in said first section at a point between the inlet set forth in (b) and the point where said first section joins said second section, and

(g) a vent outlet located in said third section at a point between the outlet set forth in (e) and the point where said third section joins said second section,

said second section comprising

(1) a central rotatable member that has a frusto-conical configuration, the smaller end of said frustro-conical member being joined to the end of said first section and the larger end of said frustro-conical member being joined to the inlet end of the screw of said third section, the outer surface of said frustro-conical member being provided with a plurality of separate spaced apart projections which are surrounded by and defined by two groups of grooves that extend in planes that intersect each other at an angle, and

(2) an annular frustro-conical wall section surrounding said central frustro-conical member and being spaced outwardly from the outer peripheral surface of said projections by a gap distance of 0.5 to 1.5 mm.

4,708,624

WASHER CUTTING APPARATUS

James T. Ligon, 800 South Main, Almont, Mich. 48003

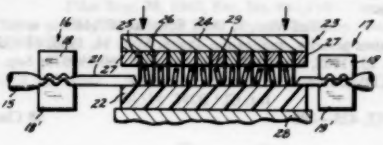
Division of Ser. No. 623,170, Jun. 22, 1984, Pat. No. 4,617,849.
This application May 12, 1986, Ser. No. 862,470
Int. Cl.[4] B26D 7/14
U.S. Cl. 425—306 **3 Claims**

1. An apparatus for the manufacture of high precision substantially parallel faced washers from stretchable elastomeric tubing comprising:

a first jaw structure selectively holding and releasing a tubular length of elastomeric material;

a second jaw structure movable toward and away from said first jaw structure and said second jaw structure selectively holding and releasing said length of tubular elastomeric material;

a cutting platen including plural parallel spaced-apart blades and located between said first and second jaw structures when said jaw structures are extended and said cutting platen movable transversely and through an axis extending between said first and second jaw structures; and



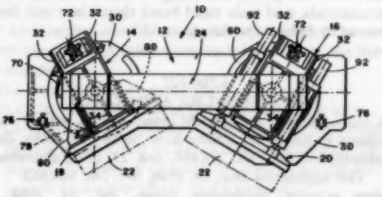
a cutting block platen in the path of movement of said cutting platen and engaging said cutting platen blades upon completion of each stroke of said cutting platen.

4,708,625

MOLD CLOSING APPARATUS

Donald P. Arend, Ada, Mich., assignor to C & F Stamping Co., Inc., Grand Rapids, Mich.

Filed Apr. 11, 1986, Ser. No. 850,753
Int. Cl.[4] B29C 45/64
U.S. Cl. 425—589 **28 Claims**



1. A mold closing assembly for supporting and selectively closing two mold sections, comprising:

a base;

a first platen support body mounted on said base and having a first platen thereon;

a second platen support body mounted on said base and having a second platen thereon;

at least one of said platen support bodies having a vertical pivot axis, said one platen support body mounted to selectively pivot relative to said base about said vertical pivot axis between an aligned position in which said platens are aligned for closing and an unaligned position in which said platens are pivotally unaligned for access;

means for selectively linearly advancing and retracting one of said platens toward the other of said platens when said one platen support body is in said aligned position; and

means for selectively pivoting said one platen support body between said aligned position and said unaligned position in a generally horizontal plane.

19. A mold closing assembly for supporting and selectively closing two mold sections, comprising:

a support bed;

two platen support bodies laterally spaced and mounted on said bed, each said platen support body having a platen thereon;

means for linearly reciprocating one of said platens with respect to the other of said platens;

means for horizontally pivoting at least one of said platen support bodies; and

a tie bar extending above said platen support bodies and coupling said platen support bodies above said platens.

4,708,626

MOLD ASSEMBLY

Etsuo Sakai, Ichikawa; Asaaki Nishioka, Chofu; Kiyosi Watanabe, Machida, and Iwao Mino, Kamakura, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 7, 1986, Ser. No. 837,449

Claims priority, application Japan, Mar. 14, 1985, 60-49245; Mar. 15, 1985, 60-50317; Sep. 11, 1985, 60-199578; Sep. 13, 1985, 60-203108; Nov. 1, 1985, 60-244080

Int. Cl.[4] B29C *51/30*

U.S. Cl. 425—398 58 Claims

1. A mold assembly for molding an article, comprising a male mold and a female mold, said male mold being made of a hydraulic material composition having high strength containing a hydraulic material as a main ingredient, said female mold being made of a substance other than said hydraulic material selected from the group consisting of fluids and rubber-like elastic materials, said male mold being thrust into said female mold so as to deform the female mold.

4,708,627

HIGH PRESSURE APPARATUS

Akira Asari, Ohsaka, and Youichi Inoue, Ashiya, both of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

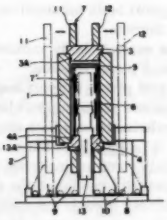
Continuation of Ser. No. 749,464, Jun. 27, 1985, abandoned.

This application Dec. 29, 1986, Ser. No. 946,643

Claims priority, application Japan, Jul. 13, 1984, 59-106598[U]

Int. Cl.[4] B30B *11/00*

U.S. Cl. 425—405 H 4 Claims



1. A high pressure apparatus, comprising:

a cylindrical high pressure stationary container having a longitudinal axis;

movable upper and lower covers for sealing upper and lower open portions of said high pressure container;

a movable support frame which undergoes axial tension and which engages simultaneously said upper and lower covers, said movable support frame being freely changed in position between a pressing position and a withdrawn position, wherein said movable support frame further comprises a first support frame and a second support frame, said first support frame being separated from said second support frame and each of said first and second support frames being pivoted about an axis parallel to said longitudinal axis of said container;

a vertically oriented member positionable between said first and second support frames for lifting and lowering an article to be processed within said container and extending axially outwardly of said container and which is provided on at least one of the upper and lower covers in a center shaft portion of the high pressure container;

means for respectively moving said first and second support frames towards one another and for engaging said first and second frames with the upper cover so as to allow for passage of said vertically oriented member therebetween and for withdrawing said first and second support frames outwardly so as to be separated from each other.

4,708,628

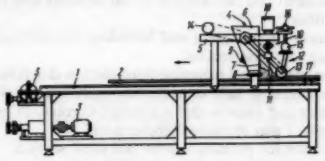
APPARATUS FOR MOLDING ARTICLES FROM FIBROUS CONCRETE

Robert M. Mkhikian; Suren G. Shaginian; Temur G. Markarian, all of Erevan; Georgy K. Khaidukov, Moscow; Sofia V. Velidzhanian, Erevan; Artashes R. Manukian, Moscow; Artur K. Karapetian, Dzhermuk; Aram V. Kazarian, and Robert R. Airapetian, both of Erevan, all of U.S.S.R., assignors to Nauchno-Issledovatelsky Institut Stroitelstva I Arkhitektury, Erevan, U.S.S.R.

Filed Dec. 3, 1986, Ser. No. 937,629

Int. Cl.[4] B28B *21/14*; B29C *39/00*

U.S. Cl. 425—406 5 Claims



1. An apparatus for molding articles from concrete containing fibers comprising:

a frame;

a tray mounted on said frame;

a gantry mounted on said frame;

said tray and gantry being capable of relative movement;

a concrete placer having a concrete levelling working member mounted on said gantry;

a compacting roller provided on said gantry after said working member;

said concrete levelling working member having the form of a plurality of rotable rod-like spirals of equal pitch and diameter arranged in the vertical plane to extend through the length of said compacting roller at an equal distance between their vertical axes, which is smaller than their diameter, with a clearance relative to said tray.

4,708,629

FILM-FORMING T DIE FOR LOW VISCOSITY RESIN

Tadashi Kasamatsu, 6-10 Shiratori 2-chome, Katsushika-ku, Tokyo, Japan

Continuation of Ser. No. 628,368, Jul. 6, 1984, abandoned. This application Feb. 19, 1986, Ser. No. 831,054

Int. Cl.[4] B29C *47/16*

U.S. Cl. 425—466 3 Claims

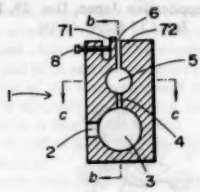
1. A film-forming T die for a low viscosity resin comprising a die block housing defining

a melted resin inlet for receiving said low viscosity resin;

a supply manifold passage which communicates with said melted resin inlet; and

a pressure equalizing manifold passage arranged substantially parallel and coextensive to said supply manifold passage and which is provided with an outlet extending along the length thereof and which forms the inlet of a die slit, said supply manifold passage and said pressure equalizing manifold passage being connected by a plurality of

melted resin passageways provided along the entire lengths of the manifold passages, the cross-sectional area of the passageways per unit length of the manifold passages gradually increasing along the manifold in a direction away from said melted resin inlet, and said supply



manifold passage having a volume at least 1.5 times greater than the volume of said pressure equalizing manifold passage;

said die slit terminating in die lips and having means for adjusting the spacing of said die lips at spaced points along the slit.

4,708,630

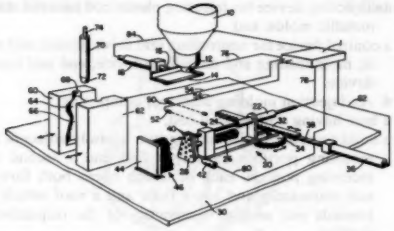
APPARATUS FOR LABELING BLOW-MOLDED ARTICLES BY PLACING LABEL DIRECTLY ON THE PARISON

Edward P. Hammond, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 683,732, Dec. 19, 1984, abandoned. This application May 19, 1986, Ser. No. 864,366

Int. Cl.[4] B29C *49/24*

U.S. Cl. 425—504 **12 Claims**



1. An apparatus for attaching at least one label to the outer surface of a blow-molded article during the formation of said article, said apparatus comprising:

(a) means for forming a parison from a heated mass of thermoplastic material, said parison having an outer surface;

(b) means for tangentially attaching said label to said outer surface of said parison;

(c) means for placing said parison with said tangentially attached label inside a blow mold cavity having an interior surface;

(d) means for expanding said parison with said tangentially attached label such that said outer surface of said parison and said tangentially attached label come into contact with said interior surface of said blow mold cavity, whereby said label is attached to said outer surface of said blow-molded article; and

(e) means for removing said blow-molded article with said attached label from said blow mold cavity.

4,708,631

INJECTION UNIT FOR INJECTION MOLDING MACHINE

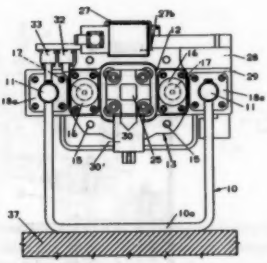
Karl Hehl, Arthur-Hehl-Strasse 32, 7298 Lossburg 1, Fed. Rep. of Germany

Filed Dec. 30, 1985, Ser. No. 814,410

Claims priority, application Fed. Rep. of Germany, Dec. 28, 1984, 3447707

Int. Cl.[4] A23P *1/00*

U.S. Cl. 425—542 **10 Claims**



1. An injection unit for an injection molding machine which injects plastic into a mold along an injection axis, the injection unit comprising:

(a) a set of stationary guide rods;

(b) a first bridge extending between said guide rods;

(c) a plastification cylinder carried by said first bridge and having an inlet and an outlet, said plastification cylinder being for receiving via said inlet, plastifying and discharging via said outlet plastic to be molded;

(d) a plastification screw in said plastification cylinder;

(e) a hydraulic injection cylinder with an injection piston thereon coupled with said plastification screw for effecting an injection stroke of said plastification screw;

(f) a set of hydraulic drive cylinders coaxial with said quide rods, each said hydraulic drive cylinder including a drive piston therein, said drive pistons of said set of hydraulic drive cylinders being firmly sealed on said guide rods;

(g) a second bridge extending between said guide rods and at least partially carrying said plastification screw, said second bridge forming a structural unit with said first bridge, with said drive cylinders and with said injection cylinder, said structural unit being movable along said guide rods by said hydraulic drive cylinders;

(h) a hydraulic decompression cylinder coupled with said plastification screw, said decompression cylinder including a plunger therein for effecting a reverse stroke of said plastification screw to relieve pressure on plastic in the plastification cylinder, said plunger being defined by a surface, said decompression cylinder being movable with said plastification screw relative to said plunger;

(i) a rotary drive motor coupled with said plastification screw for rotatably driving said plastification screw, said plastification screw, rotary motor, injection piston and movable decompression cylinder forming an axially movable unit; and

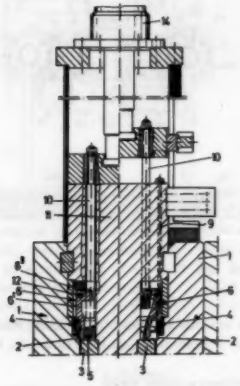
(j) antirotation means for preventing said rotary drive motor from rotating, said antirotation means including supports disposed in diametrically opposed relationship around the rotary drive motor, said supports being provided by said surface of said plunger in said decompression cylinder, said plunger being anchored in said second bridge.

4,708,632

INJECTION MOULDING MOULD

Erich Mitteregger, and Ernst Schwaiger, both of Micheldorf, Austria, assignors to I.F.W.-Industrie-Formen und Werkzeugbau-Manfred Otte Gesellschaft m.b.H. & Co. KG., Micheldorf, Austria

Filed Dec. 13, 1984, Ser. No. 681,190
Claims priority, application Austria, Dec. 29, 1983, 4560/83
Int. Cl.[4] B29C *45/40, 45/44*
U.S. Cl. 425—556 3 Claims



1. A mould for performing an injection moulding operation to produce from a thermoplastic material an annular object having an internal annular groove, said mould comprising:

a divisible outer mould;

a mould core displaceably mounted within said outer mould;

a mould ring connected to said mould core and displaceable therewith, said mould ring having an inner moulding surface for forming a portion of the object exterior;

means, connected to said mould core, for defining a moulding surface for forming the internal annular groove of the object, said means comprising a plurality of segments pivotally mounted on said mould core for movement between a moulding position, whereat said segments cooperate to define said groove forming moulding surface, and an ejection position, wherein said segments are withdrawn inwardly from said moulding position, said segments comprising double-arm levers, each said lever having first and second arms extending approximately at a right angle to each other;

a locking ring mounted for movement between a first position for contacting said first arms of said levers to move said segments to said moulding position and a second position contacting said second arms of said levers to move said segments to said ejection position; and

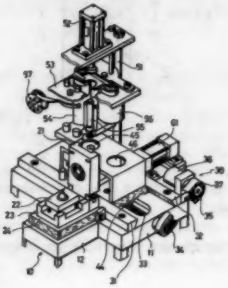
means for, upon opening of said divisible outer mould and movement of said segments to said ejection position, withdrawing from said divisible outer mould said mould core, said mould ring and said segments, said withdrawing means comprising a hydraulic piston cylinder-unit which also is operable by means of at least one rod connected to said locking ring to move said locking ring between said first and second positions thereof.

4,708,633

INJECTION MOLDING MACHINE

Keizo Hayashi, Nagoya; Hitoshi Hasegawa, Ichinomiya, and Katsuhiro Suhara, Inazawa, all of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Dec. 27, 1985, Ser. No. 813,935
Claims priority, application Japan, Dec. 29, 1984, 59-278160
Int. Cl.[4] B29C *45/04*
U.S. Cl. 425—574 10 Claims



1. An injection molding machine, comprising:

a plurality of independent metallic molds;

a metallic mold securing device having at least two receiving portions for receiving and clamping said metallic molds therein;

a base mounting said metallic mold securing device for sliding movement thereon;

a drive device for moving said metallic mold securing device on said base;

a metallic mold loading and unloading device for loading and unloading said metallic molds to and from said metallic mold securing device;

an injection device for injecting plasitcized material into said metallic molds; and

a control device for controlling said drive device, said metallic mold loading and unloading device, and said injection device.

6. An injection molding machine, comprising:

a base having a horizontal bed;

a mold securing device having two laterally-adjacent mold-receiving portions, namely a first and a second mold-receiving portion, each of which opens both forwardly and rearwardly and has a floor and a roof which slope towards one another rearwardly of the respective said portion;

station defining means defining for laterally adjoining stations on said base, a first, a second, a third and a fourth station;

said mold securing device being supported on said base for movement therealong for selectively alternatively placing:

(a) said first mold-receiving portion in said third station and said second mold-receiving portion in said fourth station;

(b) said first mold-receiving portion in said second station and said second mold-receiving portion in said third station;

(c) said first mold-receiving portion in said first station and said second mold-receiving portion in said second station;

a pair of molds, each having a lower portion and an upper portion, said upper and lower mold portions of each mold defining between them a respective mold cavity, each said mold further including means permitting the respective upper mold portion to be moved towards and away from the respective lower mold portion for closing and opening

the respective mold cavity when such mold is not received in a respective mold-receiving portion, each mold further including inlet means through which the mold cavity of that mold can be filled with a molding compound while that mold cavity is closed and received in a respective said mold-receiving portion;

each of said molds being adapted to be displaced at said third station into a respective said mold-receiving portion so as to be clamped closed therein by engagement between the respective said floor and the respective said roof, and to be displaced out of the respective said mold-receiving portion so as to discontinue clamping such mold closed so that such mold is free to be opened;

an extension of said bed of said base disposed forwardly of said third station;

displacing means associated with said third station for displacing a respective said mold, when said respective mold is located on said extension of said bed, rearwardly and in a closed condition into the respective said mold-receiving portion so as to be clamped closed therein, and for displacing a respective said mold, when located in a respective said mold-receiving portion, forwardly out of such mold-receiving portion and onto said extension of said bed so that the respective said mold may be opened for removal of a molded article therefrom; and

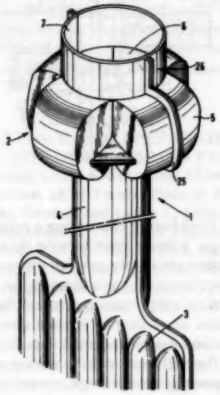
injection means associated with said second station for introducing molding compound through a respective said inlet means into a respective said mold cavity while a respective said mold is disposed in said first mold-receiving portion in said second station.

4,708,634

DRAWN ASSEMBLY FOR PULSATORY COMBUSTION

Bernard Vergne, Palaiseau, France, assignor to Societe Nationale Elf Aquitaine, Courbevoie, France and Mareck B.V., Amsterdam-Pays-Bas, Netherlands

Filed Jun. 27, 1986, Ser. No. 879,466
Claims priority, application France, Jun. 27, 1985, 85 09806
Int. Cl.[4] F23C *3/02*
U.S. Cl. 431—1 **6 Claims**



1. An assembly for pulsatory combustion, comprising:

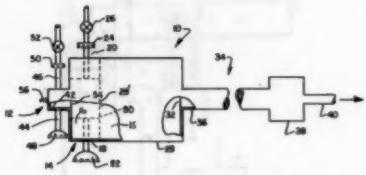
at least one pulsatory combustion chamber present in the form of a main chamber and at least two lateral chambers, wherein said at least two lateral chambers comprise at least two shells produced by drawing and interconnected to each other by welding wherein each of said at least two lateral chambers comprises at least one part of a flat tubular exchanger and a connecting horn between the said chamber and said exchanger, said assembly being made of two half-shells assembled along a plane of the tubular exchanger.

4,708,635

PULSE COMBUSTION APPARATUS AND METHOD

Palamadi S. Vishwanath, Brunswick, Ohio, assignor to American Gas Association, Cleveland, Ohio

Filed Oct. 7, 1986, Ser. No. 916,405
Int. Cl.[4] F23C *11/04*
U.S. Cl. 431—1 **32 Claims**



1. A pulse combustion apparatus wherein explosive combustion cycles provide gas pressure oscillations comprising a primary burner means operably connected to a main burner means to flow combustion gases from said primary to said main burner means, fuel supply means for self-feeding a combustible gaseous mixture of each of said primary and main burner means, combustion chamber means for pulse combustion of said combustible gaseous mixture to provide combustion gases, and exhaust means for self-exhausting said combustion gases from said apparatus, each of said burner means being separately operable after start-up to provide self-sustaining pulse combustion of said combustible gaseous mixture, said burner means also being simultaneously operable with said combustion chamber means and exhaust means cooperating to provide resonant combustion of combustible gaseous mixtures in each of said burner means at substantially the same frequency of pressure oscillations for self-feeding said combustible gaseous mixture and self-exhausting said combustion gases in accordance with said pressure oscillations.

21. A method of pulse combustion wherein explosvie combustion cycles provide gas pressure oscillations comprising the steps of:

(a) providing primary and main burner means operably connected for fluid flow therebetween;

(b) self-feeding a combustible gaseous mixture to each of said burner means;

(c) combusting said combustible gaseous mixture in each of said burner means with explosive combustion cycles to provide combustion gases, each of said burner means being separately operable after start-up to provide self-sustaining pulse combustion of said combustion gaseous mixture; and

(d) self-exhausting combustion gases from each of said burner means and flowing combustion gases from said primary burner means into said main burner means to provide an integrated pulse combustion process in said burner means at substantially the same frequency of pressure oscillations within each of said burner means.

4,708,636

FLOW SENSOR FURNACE CONTROL

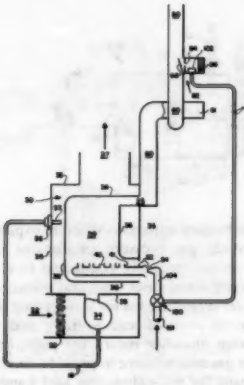
Robert G. Johnson, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 511,826, Jul. 8, 1983, abandoned. This application Oct. 10, 1985, Ser. No. 786,188
Int. Cl.[4] F23N *3/00*
U.S. Cl. 431—20 **27 Claims**

16. In a heating system having a combustion chamber with a fuel burner, an induced draft air blower, a control system

including an electrically controlled fuel valve for controlling a supply of fuel to the burner, and an exhaust stack for exhausting combustion products, the improvement comprising:

means enabling a dynamic flow between the interior of the exhaust stack and the external ambient atmosphere including a flowmeter housing connected between an opening provided in the wall of the exhaust stack and the external ambient atmosphere, said housing having a single internal chamber having a first opening connected to the opening in the wall of the exhaust stack and having a second opening connected to the external ambient atmosphere;



an electronic flowmeter disposed in said chamber for directly sensing the rate and direction of flow through said chamber and producing electrical output signals indicative thereof, said flowmeter comprising:

a thin film heater suspended in air; and

a pair of thin film heat sensors suspended in air and disposed on opposite sides of the heater; and

means connecting said electronic flowmeter output signals with said fuel valve, wherein said signals are used to control said fuel valve when predetermined conditions are indicated.

4,708,637

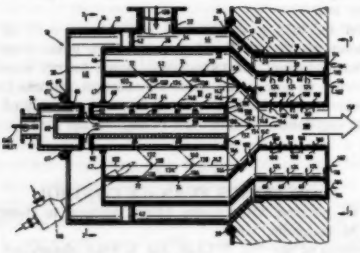
GASEOUS FUEL REACTOR

Cornel J. Dutescu, 10101 Southwest Freeway, #200, Houston, Tex. 77074

Filed Apr. 22, 1986, Ser. No. 855,076

Int. Cl.[4] F23D *14/00*; F23L *1/00*

U.S. Cl. 431—116 **15 Claims**



1. A fuel reactor comprising a plurality of concentric casings defining a plurality of concentric chambers including:

a combustion chamber;

a gas distribution chamber axially positioned within said combustion chamber, said gas distribution chamber including a plurality of ports connecting said gas distribution chamber with said combustion chamber;

a secondary air chamber surrounding said combustion chamber, said secondary air chamber having a plurality of ports connecting said secondary air chamber with said combustion chamber; and

a primary air chamber surrounding said secondary air chamber;

wherein said ports between said gas distribution chamber and said combustion chamber and said ports between said secondary air chamber and said combustion chamber are formed in corresponding circumferential arrays such that gas and air passing therethrough collide along the center line of the combustion chamber.

4,708,638

FLUID FUEL FIRED BURNER

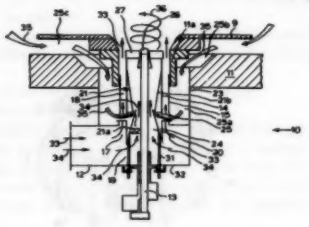
John F. Brazier, Wembley; Alan H. Young, Waterlooville; John E. Viney, Chichester, and Gordon W. Sutton, Bisley, all of Great Britain, assignors to Taurus Limited, Hampshire, United Kingdom

Filed Feb. 21, 1986, Ser. No. 832,456

Claims priority, application United Kingdom, Feb. 21, 1985, 8504475; Nov. 7, 1985, 8527477

Int. Cl.[4] F23C *9/00*; F23L *1/00*

U.S. Cl. 431—116 **7 Claims**



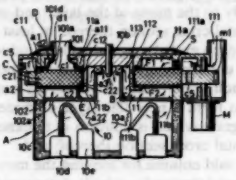
1. A fluid fuel fired burner comprising a primary combustion air supply passage, a flame zone located downstream of said primary combustion air supply passage for receiving combustion air therefrom, means for introducing flue gas to said primary combustion air supply passage, means for supplying fuel to said combustion air, a swirler located downstream of said flue-gas introduction means and upstream of said flame zone for stabilising a flame therein and for mixing said flue gas and combustion air passing therethrough, a venturi located in said primary combustion air supply passage upstream of said swirler for inducing flue gas into said primary combustion air supply passage, wherein said flue-gas introduction means comprises at least one flue-gas supply passage communicating with said venturi and having a flue-gas inlet remote from said flame zone, and a spreader plate located adjacent said flame zone for defining said flue-gas inlet remote from said flame zone whereby the flue gas induced to flow into said primary combustion air-supply passage does not disturb the stability of said flame.

4,708,639

COMBUSTOR FOR EXTERNAL COMBUSTION ENGINE HAVING ROTARY-TYPE REGENERATOR HEAT EXCHANGER

Yutaka Momose, Anjyo, and Akira Yamaguro, Chiryu, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Nov. 12, 1986, Ser. No. 929,394
Claims priority, application Japan, Nov. 14, 1985, 60-255620; Nov. 14, 1985, 60-255621
Int. Cl.[4] F23D *11/44;* F23L *15/02;* F02G *1/057*
U.S. Cl. 431—215 6 Claims



1. A combustor for use in an external combustion engine having a rotary-type regenerator heat exchanger, comprising:

a housing having a combustion chamber, an air chamber, a plurality of first outlet ports, and a first inlet port;

a main partition defining said combustion chamber and said air chamber in said housing and having a plurality of second outlet ports defined in a peripheral portion thereof and a second inlet port defined in a central portion thereof;

an annular regenerator rotatably supported in said housing and dividing said air chamber into first and second chambers, said regenerator having first and second axially opposite end surfaces and a multiplicity of axial through-holes extending therebetween;

first subpartitions defining first outlet passages communicating between said first outlet ports, respectively, and said first end surface of said regenerator, and dividing said first chamber into air and exhaust sections; and

second subpartitions defining second outlet passages communicating between said second outlet ports, respectively, and said second end surface of said regenerator, and dividing said second chamber into air and exhaust sections.

4,708,640

APPARATUS FOR BATCH PREPARATION AND FEEDING INTO THE SMELTING PROCESS

Matti E. Honkaniemi; Lauri A. Mustikka; Martti J. Jankkila; Pentti O. Hokkanen, all of Tornio, Finland; Risto M. Heikkilä, Haparanda, Sweden, and Launo L. Lilja, Pori, Finland, assignors to Outokumpu Oy, Helsinki, Finland

Continuation-in-part of Ser. No. 745,710, Jun. 17, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 945,179
Claims priority, application Finland, Jun. 27, 1984, 842577
Int. Cl.[4] F27B *15/00;* F27D *1/08*
U.S. Cl. 432—14 16 Claims

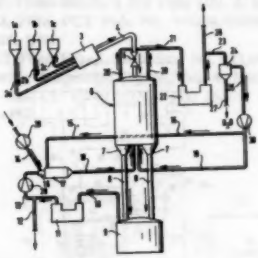
1. An apparatus for preparing a feed mixture to be fed into a smelting furnace within one unit, comprising:

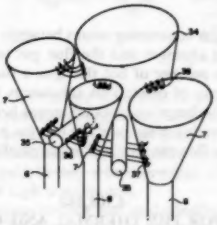
pre-treatment apparatus for the feed mixture comprising a pre-treatment silo having a uniform upper part for feeding the material thereinto in a downwardly direction and a lower part, said lower part being divided into several individual, separate downwardly conically divergent sub-silos to produce sub-flows in an upward direction;

vertical ducts coupling the bottom end of said sub-silos leading to said smelting furnace, said smelting furnace being located below said pre-treatment apparatus;

a gas distribution chamber surrounded by said individual, separate sub-silos for positioning said gas distribution chamber between or within the periphery formed by said individual, separate sub-silos;

gas distribution ducts leading from said gas distribution chamber in a direction transverse to and radially of said material feed towards said sub-silos, said ducts being pro-





vided with discharge nozzles directed transversely from said gas distribution ducts and in an upward manner towards a conically convergent region of each of said sub-silos; and

at least one gas outlet at the upper part of said pre-treatment silo.

4,708,641

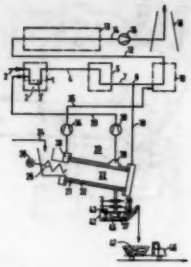
WASTE REMOVAL SYSTEM FOR PROBLEMATIC MATERIALS

Siegfried Meininger, Altenstadt, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim, Fed. Rep. of Germany

Filed Feb. 20, 1987, Ser. No. 17,467
Claims priority, application Fed. Rep. of Germany, Feb. 21, 1986, 3605693
Int. Cl.[4] F23G *7/04;* F23J *15/00*
U.S. Cl. 432—72 10 Claims

1. Waste conversion system, comprising a low-temperature carbonizing chamber wherein solid wastes containing organic substances are heated with the exclusion of air to temperatures in the range of 300° to 800° C. to effect decomposition and gasification of the organic substances, flue gas heating means around the low-temperature carbonizing chamber with a flue gas inlet in the heating means for the introduction of hot flue gas to heat the carbonizing chamber and a flue gas outlet in the heating means for the discharge of flue gas, waste charging means for feeding the solid wastes containing organic substances into the low-temperature carbonizing chamber, a residue outlet in the low-temperature carbonizing chamber for the discharge of ungasified wastes, a low-temperature carbonizing gas outlet in the low-temperature carbonizing chamber for the discharge of gaseous reaction products, a high-temperature melting chamber having an inlet for the introduction of liquid waste of high calorific value which is burned therein to aid in maintaining a temperature of at least 1200° C. in the melting

chamber, a low-temperature carbonizing gas line connecting the low-temperature carbonizing gas outlet and the high-temperature melting chamber for the transfer of the gaseous reaction products from the carbonizing chamber to the melting chamber, a flue gas outlet in the melting chamber for the discharge of hot gaseous combustion products designated hot



flue gas, flue gas connecting means between the flue gas outlet in the melting chamber and the flue gas inlet in the heating means for the passage of hot flue gas, a flue gas purification unit for removal of deleterious substances from the flue gas, and flue gas discharge connecting means between the flue gas outlet in the heating means and the flue gas purification unit for transfer of the flue gas to the flue gas purification unit.

4,708,642

PROCESS FOR THE THERMAL AND/OR CHEMICAL TREATMENT OF GRAINED, GRANULAR OR LUMP MATERIAL

Erich Sundermann; Hanno Laurien; Wolfgang Vahlbrauk, all of Braunschweig, and Hans Reye, Neustadt, all of Fed. Rep. of Germany, assignors to Perfluktiv-Consult AG, Basel, Switzerland

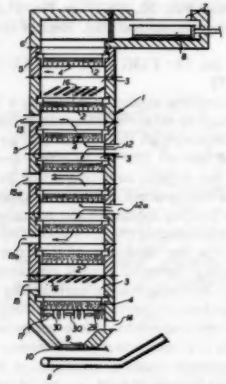
PCT No. PCT/EP85/00115, § 371 Date Nov. 22, 1985, § 102(e) Date Nov. 22, 1985, PCT Pub. No. WO85/04467, PCT Pub. Date Oct. 10, 1985

PCT Filed Mar. 16, 1985, Ser. No. 808,449

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1984, 3410896

Int. Cl.[4] F27D *1/08*

U.S. Cl. 432—95 **7 Claims**



1. An apparatus for treating a flowable solid material, comprising:

a column;

a multiplicity of vertically spaced horizontal bar grates in said column receiving respective gas-permeable flat layers of said flowable solid material of a thickness such that above each such layer a respective free space is maintained, at least some of the bars of each of said grates being movable;

means for laterally inducing at least one gas into one of the free spaces on each side of a respective layer while laterally withdrawing the respective gas from another free space on an opposite side of the respective layer to cause the respective gas to traverse the respective layer perpendicularly to the plane of the layer and uniformly over the horizontal cross section thereof, at least some of the grate bars of each grate being movable to induce said material to trickle uniformly over the cross section of the column from each upper grate downwardly onto the next lower grate to form a new flat layer of material on each next lower grate which is uniform in thickness over the entire horizontal cross section thereof; and

means on said column for moving the movable grate bars to induce said material to trickle downwardly, said means on said column for moving the movable grate bars of each grate is connected to at least one assembly of grate bars shiftable out of the respective plane.

4,708,643

APPARATUS FOR CHARGING A SHAFT FURNACE FOR BURNING CARBONACEOUS MATERIAL

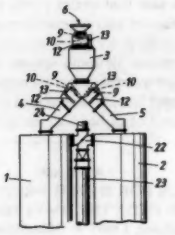
Michael Nagl, St. Marien; Gerhard Fugger, Hörsching; Jaroslav Mraz, Neuhofen; Horst Mailländer, Linz; Ernst Rottenmanner, Linz; Norbert Rauber, Linz, and Wolfgang Luger, Amstetten, all of Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Mar. 28, 1986, Ser. No. 845,450

Claims priority, application Austria, May 10, 1985, 1411/85

Int. Cl.[4] F27D *1/08*

U.S. Cl. 432—95 **2 Claims**



1. In an apparatus for charging a carbonaceous mineral feed material to a shaft furnace having a plurality of furnace shafts, which apparatus comprises

a like plurality of charging ducts connected to respective ones of said furnace shafts, and

a common feed container holding the feed material and having an inlet port and a plurality of outlet ports, each of which is connected to one of said charging ducts, and each of said inlet and outlet ports having an upstream side and a downstream side,

the improvement comprising

a respective shut-off valve associated with, and operable to open and close, each one of said inlet and outlet ports so that said common feed container constitutes a lock chamber, each of said shut-off valves comprising a valve flap disposed on the downstream side of the associated port and movable to a closed position to close the associated port,

sealing means on the feed container arranged around each of

said ports and facing said valve flap in sealing contact with said valve flap in said closed position,

an actuating arm operatively connected to each of said valve flaps and pivotally movable in valve-opening and valve-closing senses,

stop means permitting a limited pivotal movement of said actuating arm relative to said valve flap so that said actuating arm is operable to perform a lost motion relative to said valve flap, and

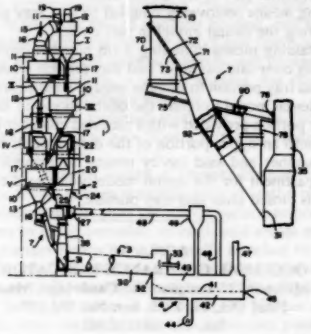
a vent valve in each of said valve flaps, the vent valve being operatively connected to said actuating arm and arranged to be opened by said actuating arm during said lost motion thereof in said valve-opening sense.

4,708,644

APPARATUS FOR ROASTING FINE GRAINED MATERIAL

Thomas R. Lawall, Emmaus, and Stephen A. Lukacz, Nazareth, both of Pa., assignors to Fuller Company, Bethlehem, Pa.

Filed Jul. 8, 1986, Ser. No. 883,420
Int. Cl.[4] F27B 7/02
U.S. Cl. 432—106 **12 Claims**



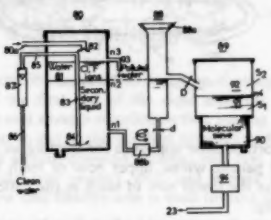
12. Apparatus for roasting fine grained material comprising a furnace means having a material inlet and a material outlet wherein fuel is supplied to and combustion takes place within said furnace; means for further processing material discharged from the said furnace means; means defining a first conduit for supplying material from the material outlet of said furnace means to said means for further processing the material; means for recirculating at least a portion of the material from the material outlet of the furnace means through said furnace means before it is supplied to the means for further processing the material including means defining a second conduit flow connecting the material outlet of the furnace means with the material inlet of the furnace means; and means defining a third circuit for by-passing material from said furnace means directly to the means for further processing the material around said first and second conduits.

4,708,645

MACHINES FOR HEATING ARTICLES OR PRODUCTS BY CONDENSING VAPORS ON THEM

Richard Pescatore, Antibes, and Jean-Jack Boumendil, Villeneuve Loubet, both of France, assignors to Piezo-Ceram Electronique, Antibes, France

PCT No. PCT/FR86/00028, § 371 Date Oct. 3, 1986, § 102(e) Date Oct. 3, 1986, PCT Pub. No. WO86/04533, PCT Pub. Date Aug. 14, 1986
PCT Filed Feb. 3, 1986, Ser. No. 921,044
Claims priority, application France, Feb. 4, 1985, 85 01489
Int. Cl.[4] F27B 9/04; F28D 15/00
U.S. Cl. 432—152 **5 Claims**



1. In a machine for heating an article or product to a high temperature by condensing vapor on it, which comprises:

a chamber for heating the article or product which is to be heated, said chamber being adapted to receive a vapor of a primary liquid having a boiling point which is at least equal to said high temperature,

at least one passage leading into said chamber for the introduction and discharge of said article or product to be heated,

heating means adapted to bring to boiling point a primary liquid contained in a boiler and to produce primary vapor intended to be delivered into said chamber,

primary condensation means adapted to condense the primary vapor into primary liquid, and to return it to the boiler,

means for establishing in said passage a mass of vapor of a secondary liquid having a boiling point lower than that of the primary liquid, said mass completely filling a portion of said passage,

secondary condensation means adapted to condense the secondary vapor into secondary liquid,

secondary collector means adapted to collect the secondary vapor condensate, which contains H^+, Cl^-, and F^- ions generated during operation of said machine and water coming from air moisture, and to pass it into a secondary liquid purification device for the purpose of dewatering said condensate before recycling it to the means of establishing the mass of secondary vapor, the improvement wherein said secondary liquid purification device comprises

a first vessel containing a lower layer of secondary liquid and an upper layer of water,

means for delivering the secondary vapor condensate coming from said secondary collector means into said first vessel in such a manner that said condensate passes through said upper layer of water and is freed of H^+, Cl^-, and F^- ions before being admixed with said lower layer of secondary liquid,

means for supplying fresh water to said first vessel,

an upper outlet provided at an upper level of said first vessel for overflow of said upper layer,

a lower outlet provided at a lower level of said first vessel for withdrawing secondary liquid containing residual water from said lower layer,

a second vessel connected to said lower outlet and provided with means for removing residual water from said water-containing secondary liquid, and

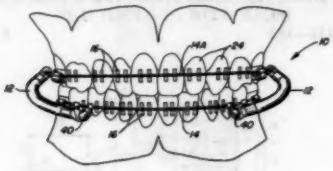
means for recycling the dewatered secondary liquid to the means of establishing the mass of secondary vapor.

4,708,646

ORTHODONTIC DEVICE FOR CORRECTING THE BITE

James J. Jasper, P.O. Box 1540, Guerneville, Calif. 95446

Filed Apr. 1, 1986, Ser. No. 846,809
Int. Cl.[4] A61C *3/00*
U.S. Cl. 433—19 **20 Claims**



1. An orthodontic appliance for treating an overbite condition in a patient whose upper row of teeth lies abnormally forward of the lower row of teeth in the patient's lower jaw, comprising:

upper attachment means adapted to be secured to at least some of said upper row of teeth;

lower attachment means adapted to be secured to said lower row of teeth;

at least one flexible, nonstretching appliance element each extending between and attached by swivel means to said upper attachment means and to said lower attachment means and adapted to lie on one side of the patient's jaw, said flexible element having sufficient stiffness to exert a small axial pushing force from end to end when flexed, each said element having end means for bearing against a said attachment means while allowing the element to swivel relative to said attachment means;

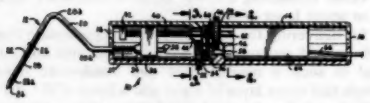
whereby said appliance element, when installed in a patient's mouth and in a slightly flexed condition, exerts a small pushing force on the patient's upper and lower jaws, the swivelability tending to correct said overbite condition, said element allowing the patient to move his jaws to talk, chew and cleanse both rows of teeth.

4,708,647

PERIODONTAL PROBE INSTRUMENT

David J. Pippin, Shawnee, and Diana J. Stindt, Prairie Village, both of Kans., assignors to The Curators of the University of Missouri, Columbia, Mo.

Filed Mar. 7, 1986, Ser. No. 837,150
Int. Cl.[4] A61C *3/00*
U.S. Cl. 433—32 **19 Claims**



1. A periodontal instrument for measuring the depth of a periodontal pocket in the gingiva adjacent to a tooth, said instrument comprising

a periodontal probe having a transparent portion insertable into the pocket and terminating in a tip located at the bottom of the pocket when the probe is inserted therein, said probe having a longitudinal passage therein;

a fiber received in said passage for axial extension and retraction therein, said fiber having a free end;

means for effecting extension and retraction of said fiber in said passage to permit said leading end of the fiber to be retracted until visible at the gingival margin; and

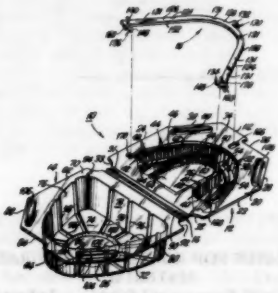
means for measuring the distance between said tip of the probe and said free end of the fiber to measure the pocket depth.

4,708,648

DENTAL MODEL PROTECTIVE CARRIER

Bernard Weissman, New York, N.Y., assignor to IPCO Corporation, White Plains, N.Y.

Filed Feb. 24, 1986, Ser. No. 832,305
The portion of the term of this patent subsequent to Sep. 3, 2002, has been disclaimed.
Int. Cl.[4] A61C *19/00*
U.S. Cl. 433—49 **19 Claims**



1. A protective carrier for a dental model having a pedestal part, comprising:

a tray portion provided with a recessed cavity for receiving the pedestal part of the dental model;

retaining means removably coupled to said tray portion for securing the dental model in said cavity;

said retaining means including a rib member partially projecting over said cavity of said tray portion when coupled to said tray portion to thereby engage a ledge provided on the dental model to retain the dental model in said cavity;

a cover portion provided with a recessed chamber for covering onto an upper portion of the detal model; and

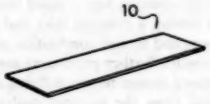
said chamber and said cavity mating to provide a closed compartment for the dental model when said cover portion is closed onto said tray portion.

4,708,649

OCCLUSAL CLEARANCE INDICATOR

Philip L. Millstein, 15 Langdon St., Cambridge, Mass. 02138

Filed Oct. 31, 1985, Ser. No. 793,137
Int. Cl.[4] A61C *9/00*
U.S. Cl. 433—71 **3 Claims**



1. An occlusal indicator for measuring the occlusal clearance between a tooth ground down for a cast restoration and an opposing tooth, said ground down tooth lying between adjacent teeth, the indicator comprising,

a strip of polystyrene-type impressionable material, said strip of material being between about 1 and 2 millimeters in thickness, said 1 millimeter the amount of space required for placing a metal restoration and said 2 millimeters

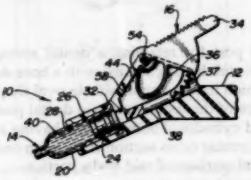
being the amount of space required for placing a pocelain-coated restoration, and said strip being between about 4 and 15 millimeters in width, the width being no wider than the distance between the adjacent teeth such that the width of the strip will lie completely between the adjacent teeth at normal occlusion.

4,708,650

DIRECT DELIVERY SYSTEM FOR DENTAL MATERIALS

Robert D. Holewinski, Lakehurst; William J. Blatherwick, Hamilton Square; Leslie Hamilton, Trenton, all of N.J., and Thomas E. Wells, Sr., Richboro, Pa., assignors to Johnson & Johnson Dental Products Company, East Windsor, N.J.

Filed Feb. 10, 1986, Ser. No. 827,686
Int. Cl.[4] A61C *5/04*
U.S. Cl. 433—90 **6 Claims**



1. An applicator for accurately dispensing a small amount of a fluid to tooth surfaces, which comprises, in combination:

(a) an elongated handle member having a longitudinal axis and a front end;

(b) nozzle receiving means located at the front end of said handle member, said nozzle receiving means including a first housing, said first housing having a front end, a rear end, a longitudinally extending cut-out portion that extends to the front end of said first housing, and a plunger access port located at the rear end of said first housing and having a peripheral surface, wherein said plunger access port communicates to a second housing that extends upwardly from said handle member;

(e) plunger means mounted such that it can reciprocate through said access port from a retracted position to an activated position;

said second housing having a plunger channel having a surface which merges smoothly with at least a portion of said plunger access port peripheral surface to permit said plunger to move smoothly through said access port;

(f) said plunger means being integrally attached by an integral flexible connector to an integral finger operable lever means pivotally mounted in said second housing such that when said lever means is depressed the plunger means is pushed from the retracted to the activated position and smoothly through said plunger access port; and,

(g) spring means in said second housing integrally connected to said lever means to normally maintain the plunger means in the retracted position.

4,708,651

ENDODONTIC ROOT CANAL FILE BENDING PLIERS

L. Stephen Buchanan, 179 Hermosillo Rd., Montecito, Calif. 93108

Filed Aug. 22, 1986, Ser. No. 899,342
Int. Cl.[4] A61C *3/00*
U.S. Cl. 433—157 **20 Claims**

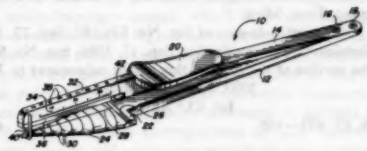
1. An endodontic tool for bending root canal files, comprising:

a rigid arm having a first end and a second end;

a flexible arm attached at a first end thereof to said first end of said rigid arm, said flexible arm having a second end which extends over and is spaced away from said second end of said rigid arm;

a first gripping surface located at said second end of said flexible arm and facing said first arm;

a smooth rounded surface located at said second end of said rigid arm and facing said first gripping surface, said smooth rounded surface being characterized by ever decreasing radii of curvature at locations moving farther away from the first end of the rigid arm, the circular segments in said smooth rounded surface passing through a line parallel to and facing said first gripping surface, said line being a second gripping surface, said first gripping being brought into contact with said second gripping surface when said flexible arm is bent toward said rigid arm.

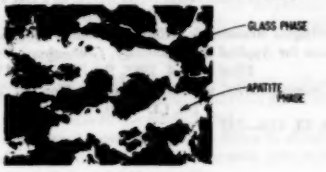


4,708,652

APATITE COMPOSITE CERAMICS

Takamitsu Fujiu, Tokyo; Masaaki Mochida, and Makoto Ogino, both of Kawasaki, all of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Continuation-in-part of Ser. No. 681,185, Dec. 13, 1984, abandoned. This application Dec. 19, 1985, Ser. No. 810,604
Claims priority, application Japan, Mar. 6, 1984, 59-42474
Int. Cl.[4] A61C *8/00*; C03C *10/16*
U.S. Cl. 433—201.1 **6 Claims**



4. An apatite composite ceramic comprising a fluorapatite phase and an at least partially crystallized biologically active glass phase, which ceramic is obtained by reaction-sintering at a sintering temperature of 900°–1100° C. at a pressure of at least atmospheric pressure a powder mixture of a synthetic hydroxyapatite (A) and a biologically active glass (B) selected from the scope of the following composition:

SiO_2	35–60 mol %
B_2O_3	0–15 mol %
Na_2O	10–30 mol %
CaO	5–40 mol %
TiO_2	0–10 mol %
P_2O_5	0–15 mol %
K_2O	0–20 mol %
Li_2O	0–10 mol %
MgO	0–5 mol %
$Al_2O_3 + ZrO_2 + Nb_2O_5$	0–8 mol %
$La_2O_3 + Ta_2O_5 + Y_2O_3$	0–8 mol %
F_2	5–20 mol %

said biologically active glass having a crystallization tempera-

ture below said sintering temperature, the weight ratio of A/B ranging from 60/40 to 30/70.

4,708,653

DENTAL DRILL BIT HAVING DISORDERED, WEAR RESISTANT BORON CARBON EXTERNAL COATING

Erwin Eichen, West Bloomfield, and James Flasck, Rochester, both of Mich., assignors to Ovonic Synthetic Materials Company, Troy, Mich.

Continuation-in-part of Ser. No. 535,352, Sep. 23, 1983, abandoned. This application Sep. 17, 1986, Ser. No. 908,448
The portion of the term of this patent subsequent to Jun. 10, 2003, has been disclaimed.
Int. Cl.[4] A61C *3/02*
U.S. Cl. 433—165 6 Claims

1. A coated dental burr adapted for high speed use comprising:

(a) a dental burr substrate;

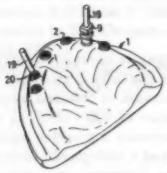
(b) a coating on said substrate comprising an external layer of disordered boron and carbon.

4,708,654

POSITIVE CAST MODEL OF AN UPPER AND LOWER JAW, AND A METHOD AND MEANS FOR PRODUCING SUCH A MODEL

Per-Ingvar Branemark, Mölndal, Sweden, assignor to The Institute for Applied Biotechnology, Gothenburg, Sweden

Filed Nov. 4, 1985, Ser. No. 794,827
Claims priority, application Sweden, Nov. 20, 1984, 8405825
Int. Cl.[4] A61C *11/00*
U.S. Cl. 433—213 12 Claims



1. Positive cast model of a lower or upper jaw, including one or several fixture means implanted into the jawbone, each of which is provided with a distance means, having an upper portion protruding over the alveolar arch and means for the attachment of a prosthetic appliance, the main part of the model consisting of a casting material molded in a negative impression of the lower or upper jaw, characterized in that each distance means is in the model replaced by a dummy made of a harder matrial than the casting material, provided with an upper portion having the same outer form as that of the upper portion of the distance means and having the same orientation in the model as that of the distance means in the alveolar arch, and a lower portion having locking means for the fixation or the dummy in the casting material.

4,708,655

CONTOURED DENTAL POST AND DRILL JIG FOR USE THEREWITH

Bernard Weissman, 225 E. 48th St., New York, N.Y. 10017

Continuation-in-part of Ser. No. 735,548, May 20, 1985, Pat. No. 4,600,392. This application Jul. 10, 1986, Ser. No. 884,221
Int. Cl.[4] A61C *5/04*
U.S. Cl. 433—225 17 Claims

1. A dental post for retaining a dental restoration onto a prepared tooth stub having a canal with a bore drilled into the canal walls which have an approximate oval shape adjacent to an outer surface of the tooth stub, said dental post comprising:

an elongated cylindrical body portion having a substantially uniform circular cross section from a top end portion to a bottom end portion of said body portion;

rib means provided on an upper portion of said body portion for extending into the canal and for fitting the approximate oval shape of the canal in the tooth stub;

said rib means including a pair of diametrically opposed radially projecting ribs extending from said top end portion longitudinally along said upper portion of said body portion and being spaced from said bottom end portion;

both said ribs being continuously downwardly tapered from said top end portion of said body portion so that each of said ribs has its largest lateral cross section at said top end portion;

one of said ribs being longer than the other rib to provide pilot means for inserting said ribs into the bore; and

said body portion including peripheral securing means for anchoring said body portion with cement within the bore in the tooth stub so that a part of said upper portion of said body portion extends above the tooth stub.

4,708,656

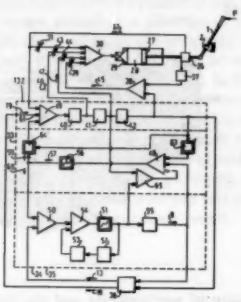
SIMULATOR OF MECHANICAL PROPERTIES OF A STEERING SYSTEM

Luitzen de Vries, Amstelveen, and Gerhard J. Wierda, Lisserbroek, both of Netherlands, assignors to Fokker B.V., Netherlands

Filed Feb. 4, 1986, Ser. No. 826,029
Claims priority, application Netherlands, Nov. 11, 1985, 8503096
Int. Cl.[4] G09B *9/08*
U.S. Cl. 434—45 20 Claims

1. In a flight simulator or similar system which includes a manually operated control member and a servo means connected thereto for acting and reacting on the control member to simulate response of a controlled member such as a control surface under flight conditions, said servo means including a servo valve, amplifier means for controlling the servo valve in response to a plurality of inputs thereto, computer means for producing flight simulating signals, electrical analogue means by producing output signals feeding the amplifier means and including a combining circuit, a divider and first and second integrators, all in series, the combining circuit having an input from the computer means which represents simulated flight conditions, pick-up means having an output which represents manual input force applied to the control member, a second amplifier having the output of the pick-up means connected as an input thereto and the output of the second integrator as an input thereto and having an output representing position error

of the control member which is connected to the amplifier means, the divider dividing the output of the combining circuit by a value representing the mass of the control member to produce a control member acceleration-related signal applied to the first integrator whereby the output of the first integrator is a control member velocity-related signal and the output of the second integrator is a control member position-related signal, the acceleration-related signal and the velocity-related



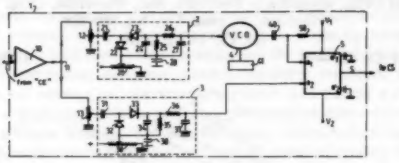
signal being connected as inputs to the amplifier means, the improvement comprising controllable limiter means connected in negative feedback relation from the output of the first integrator to the input to the divider for simulating the mechanical Coulomb friction of the control member, and control means connected between the combining circuit and the limiter for providing sum and difference signals, respectively, of the output of the combining circuit and an external friction signal to the limiter.

4,708,657

AUDIO-FREQUENCY CONVERTER APPARATUS, FOR TREATING SUBJECTS SUFFERING FROM AUDIO-PHONATORY AND AUDITIVE-VERBAL DISORDERS, AND A METHOD OF USING THE APPARATUS

Isi Beller, 51, rue Saint-André-des-Arts, 75006 Paris, and Boris Fradin, Noisy S/Ecole, both of France, assignors to I. Beller, Paris, France

Filed Jul. 18, 1985, Ser. No. 756,231
Claims priority, application France, Jul. 27, 1984, 84 12019
Int. Cl.[4] H04R *3/12*
U.S. Cl. 434—185 **16 Claims**



1. An audio-frequency apparatus for treating subjects suffering from audio-phonatory disorders, comprising:

at least one means for generating signals corresponding to audio-frequency sounds;

parameter converter means for generating parametric signals by converting said signals corresponding to said audio-frequency sounds;

means for selectively inputting said signals corresponding to said audio-frequency sounds generated by said at least one generating means to said parameter converter means, so that said parametric signals correlate with said audio-frequency sounds; and

electro-acoustic transducer means for applying parametric sounds representing said parametric signals, and said audio-frequency sounds, to a subject being treated; and

means for inputting said parametric signals, generated by said parameter converter means, to said electro-acoustic transducer means;

wherein: each said parametric signal is converted by said parameter converter means from each respective one of said signals corresponding to said audio-frequency sounds to have a frequency corresponding to the amplitude of said audio-frequency sounds, which frequency decreases from a predetermined high frequency near the upper limit of the audible range of each said subject as said amplitude increases, and an amplitude which increases as said frequency decreases; said parameter converter means comprises two threshold detectors connected in parallel for receiving said signals corresponding to said audio-frequency sounds; and respective outputs of said threshold detectors control respective ones of said frequency and amplitude of said parametric signals, depending on the amplitude of respective ones of said signals corresponding to said audio-frequency sounds; and

wherein a mixture of comprehensible sounds and parametric sounds are introduced to the ears of the subject, with the ratio of the comprehensible sounds to parametric sounds introduced into one ear of the subject being different from the ratio of the comprehensible sounds to parametric sounds introduced into the other ear of the subject, so that compensation of the audio-frequency disorder may be achieved.

15. A method of treating subjects suffering from audio-phonatory and auditive-verbal disorders using an apparatus comprising:

at least one means for supplying a signal representing comprehensible audio-frequency sounds;

parameter converter means for generating a parametric signal based on said signal representing comprehensible sounds; and

output means for applying said parametric signal and said signal on which it is based with a selectable ratio of the amplitude of said parametric signal to the amplitude of said signal on which it is based for each ear of a subject being treated;

said method comprising the steps of:

introducing, by use of said apparatus, a mixture of said comprehensible audio-frequency sounds and parametric sounds to each each of the subject; and

adjusting said output means so that the ratios of comprehensible sounds to said parametric sounds introduced into the ears of the subject are different,

wherein said parametric signal as supplied to any ear of said subject comprises a frequency descending from a predetermined frequency near the upper limit of the audible range of the subject with increasing amplitude of said signal representing said audio-frequency sounds, with respect to a first threshold, and an amplitude which increases with increasing amplitude of said signal representing said audio-frequency sounds with respect to a second threshold.

4,708,658

APPARATUS FOR ELIMINATING NOISE IN CONDUCTIVE-BEARING ELECTRICAL CONNECTORS

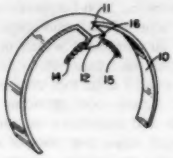
Albert W. Kapler, 6 Travers Ave., Edison, N.J. 08817, and Joseph A. Kapler, 197 R Fresh Ponds Rd., South Brunswick, N.J. 08831

Filed Aug. 20, 1986, Ser. No. 898,354
Int. Cl.[4] H01R *39/00*
U.S. Cl. 439—21 **17 Claims**

1. In a ball bearing assembly having an outer and an inner race and operative to rotate with respect to one another about a common axis, to allow an input wire electrically coupled to the outer race to rotate with respect to an output wire electrically coupled to the inner race, the improvement in combina-

tion therewith of an apparatus for eliminating electrical noise due to said rotation, comprising:

an electrically conductive C-shaped member adapted to be clamped over said outer race and including a spring assembly secured to said member for resiliently contacting said inner race during rotation of said assembly to provide a low noise electrical path between said inner and outer races during said rotation, said C-shaped member including a projecting extending flange extending from the periphery thereof and integral with a depending flange extending towards said inner race with said depending flange electrically connected to right and left depending conductive spring assemblies for contacting the surface of said inner race to maintain an electrical connection between said outer and inner races during rotation of said bearing assembly.

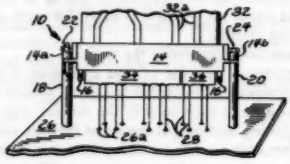


4,708,659

PC BOARD CONNECTOR WITH SHORTING BUS BAR

George Wozniczka, Chicago, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Aug. 25, 1986, Ser. No. 900,027
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—62 **15 Claims**



1. A PC board edge connector coupled to a first PC board maintained at a given voltage level, said connector comprising:

an elongated housing open along first and second facing edges thereof and adapted for coupling to the first PC board along the first edge thereof and including a plurality of spaced, linearly aligned terminal pins along the second edge thereof;

conductive mounting means for engaging a plurality of said terminal pins of said housing, said conductive mounting means including an elongated, linear bus bar comprised of a resilient material and having an upper, open edge adapted to receive said terminal pins in tight-fitting engagement and a lower, closed edge;

conducting means including a plurality of leads extending therefrom engaged by the lower, closed edge of said mounting means and maintained in electrical connection with and across a plurality of said terminal pins by said mounting means; and

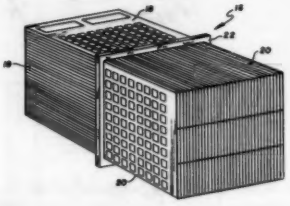
conductive coupling means for electrically coupling said terminal pins, said mounting means and said conducting means, wherein the leads of said conducting means are maintained at the voltage level of the first PC board.

4,708,660

CONNECTOR FOR ORTHOGONALLY MOUNTING CIRCUIT BOARDS

Richard J. Claeys, Bloomington; Ronald R. Denny, Brooklyn Center; Joseph D. Vaughan, Burnsville, and Charles Eumurian, Mahtomedi, all of Minn., assignors to Control Data Corporation, Minneapolis, Minn.

Filed Jun. 23, 1986, Ser. No. 877,311
Int. Cl.[4] H01R *23/70*
U.S. Cl. 439—65 **22 Claims**



5. An assembly of mechanically and electrically interconnected circuit boards, including:

a first row of substantially parallel and aligned first circuit boards;

a first plurality of substantially identical connectors supported along an interface edge of each first circuit board, each connector in a select orientation with respect to its associated first circuit board;

a second row of substantially parallel and aligned second circuit boards; and

a second plurality of connectors, each substantially identical to the connectors of said first plurality, supported along an interface edge of each second circuit board, each connector of said second plurality in a select orientation with respect to its associated second circuit board;

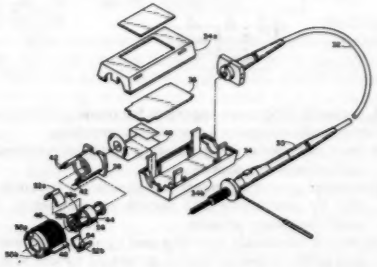
wherein each of the connectors along the interfacing edge of each first circuit board is in an interlocking engagement with one of the connectors associated with each of said second circuit boards, to maintain said first and second rows in an edge facing relation to one another.

4,708,661

MODIFIED BNC CONNECTOR FOR ACTIVE PROBE

Mark R. Morland; Paul A. Cole, both of Portland; Ivan J. Cousins, and Raymond A. Zandonatti, both of Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Jul. 28, 1986, Ser. No. 889,488
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—77 **5 Claims**



1. An electrical connector for connecting an electronic instrument with a peripheral device comprising:

(a) two cooperatively mating portions including:

(1) a first portion comprising a first half of a BNC connection having circuit means disposed about the periphery thereof on a planar surface for providing a plurality of electrical contact points arranged along an arc of a first circle concentric with said first half of said BNC connection;

(2) a second portion comprising a second half of a BNC connection held within a cylindrical carrier means, said carrier means including a plurality of pins extending therefrom disposed about the periphery of said second half of said BNC connection along an arc of a second circle concentric with said second half of said BNC connection corresponding in position to said first circle wherein said pins are thereby adapted to mate with said electrical contact points on said circuit means; and

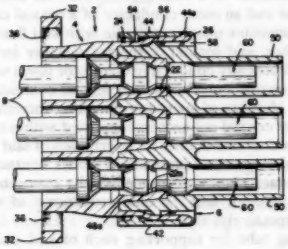
(b) bezel means for masking portions of said circuit means and containing apertures for providing access to said circuit means by said pins whereby said pins are guided onto said corresponding contact points.

4,708,662

CONNECTOR ASSEMBLY WITH PRE-STAGED TERMINAL RETAINER

David A. Klein, Kernersville, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 20, 1986, Ser. No. 876,572
Int. Cl.[4] H01R *13/627*
U.S. Cl. 439—353 **12 Claims**



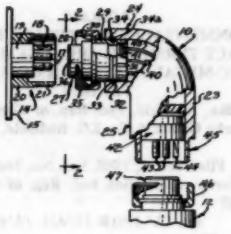
1. An assembly comprising a plurality of terminals and a terminal housing and a terminal retainer intermatable to form a first connector half for interconnection to a mating second connector half; the terminal housing and the terminal retainer each comprising one-piece molded insulative members; the terminal housing and the terminal retainer each having a plurality of aligned cavities, each pair of aligned cavities containing a single terminal, the assembly being characterized by a two position latch means for retaining the terminal housing and the terminal retainer in first and second positions, the latch means comprising at least one flexible arm insertable into a coupling flange having open ends and a closed envelope, the coupling flange having two end walls and an outer wall spaced from one side of the terminal housing, and two spaced latching bosses, the first latching boss extending inwardly from the interior of the outer wall and the second latching boss being opposed thereto, whereby the flexible arm can be inserted through the coupling flange, the flexible arm having a shoulder positionable between the first and second latching bosses in the first position and insertable beyond the second latching boss camming the flexible arm outwardly into the second position to bring the shoulder into engagement with the outer wall in the second position.

4,708,663

ROTATABLE ELECTRICAL ELBOW FITTING

George R. Eckart, Evanston, Ill., assignor to Woodhead Industries, Inc., Northbrook, Ill.

Filed Apr. 21, 1986, Ser. No. 854,036
Int. Cl.[4] H01R *13/58*
U.S. Cl. 439—469 **6 Claims**



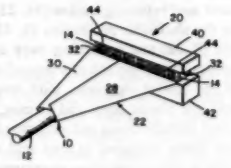
1. An electrical connector device adapted to couple a connector of a flexible cord to a fixed connector comprising: a rigid, one-piece tubular body forming first and second cylindrical portions having their respective axes angularly inclined relative to each other; a first connector insert including a sleeve rotatably received in said first cylindrical portion whereby said insert may be rotated within said first cylindrical portion for adjustment over a continuous angular range relative to the axis of said second cylindrical portion; a second connector insert received in said second cylindrical portion of said body; each connector insert having a corresponding plurality of electrical connecting elements; a plurality of wires, each wire interconnecting corresponding connecting elements of said first and second connector inserts together and extending loosely and freely within said tubular body, the length of said wires being such that said sleeve may be twisted within said first cylindrical portion without excessively straining any of said wires or their associated connections; and releasable locking means for selectively fixing said sleeve to said first cylindrical portion of said body.

4,708,664

MULTIPURPOSE BOOT FOR ROUND-TO-FLAT ELECTRICAL CABLE

Kenneth Yard, 10 Saratoga Dr., Worcester, Mass. 01606

Filed Jun. 12, 1986, Ser. No. 876,671
Int. Cl.[4] H01R *13/56*
U.S. Cl. 439—471 **24 Claims**



1. A cable system comprising an insulation displacement connector, a round-to-flat multiconductor cable and a multipurpose boot, said cable having an end portion where the conductors are in a flat configuration, a round portion where the conductors are in a round configuration and enclosed in a jacket and a transitory portion between said end portion and said round portion where the conductors are not in a round configuration, not jacketed and not in a flat configuration, said connector having a top section, and a bottom section, one of said sections having a plurality of tines, said boot comprising a

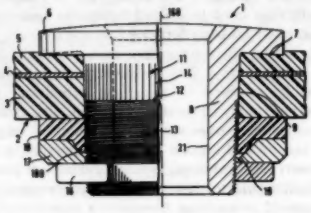
sheet of flexible material at least partially encompassing said conductors in said transitory portion and having a tab portion extending together with said end portion of said cable into and clamped between said top section and said bottom section of said connector and in contact with said times in said connector.

4,708,665

ENVIRONMENTALLY PROTECTED ELECTRICAL CONTACT TERMINAL ARRANGEMENT FOR A PLASTIC-METAL-PLASTIC LAMINATED CYCLE FENDER

Heinrich Belka, Bielefeld, Fed. Rep. of Germany, assignor to ESGE-Marby GmbH & Co. KG, Bielefeld, Fed. Rep. of Germany

Filed Jun. 3, 1985, Ser. No. 740,559
Claims priority, application Fed. Rep. of Germany, Jun. 6, 1984, 3420960
Int. Cl.[4] H01R *13/415, 13/42*
U.S. Cl. 439—551 20 Claims



1. In combination with a plastic (3) - metal foil (4) - plastic (5) laminated cycle fender (2) formed with an opening therethrough, in which the metal foil is embedded in the plastic, said plastic defining a plastic top layer (5), and

a plastic bottom layer (3); and wherein the metal foil (4) is positioned between said top and bottom layers,

an environmentally protected electrical contact terminal arrangement to make a reliable electrical contact with the metal foil (4) which is embedded in and between said plastic layers (3, 5) and having

a metallic head (6) formed with an underside (7) fitting against one outer plastic surface of one of said plastic layers of the fender (2) and forming a first bearing surface;

a shaft-like projection (8) extending at essentially a right angle to the underside of the metallic head and located in the opening of the fender;

an attachment and retaining means (16, 22), contrically surrounding the shaft-like projection (8, 32), secured to the projection (8, 32) and extending over and overlapping a second plastic outer surface of a second one of said plastic layers of the fender, opposite, with respect to the metal foil, of said one plastic layer and forming a second bearing surface, said metallic head and said attachment and retaining means being engaged against said outer plastic surfaces to clamp said terminal arrangement to the fender (2),

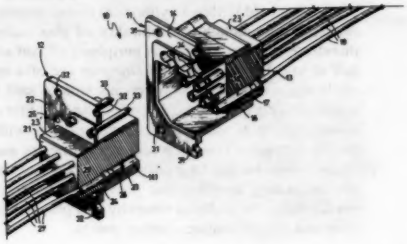
wherein the shaft-like projection (8, 32) defines a contact location for electrical contact with the embedded metal foil (4),which contact location comprises a single cylindrical element of circular cross section, unitary with the head, the shaft-like projection being formed at its outside with a plurality of rib-like contact protrusions (14) extending generally axially along the shaft-like projection and projecting radially outwardly with respect to the circular cross section of the shaft-like projection to penetrate and engage said metal foil embedded between said plastic layers (3, 5).

4,708,666

TRIAXIAL TO COAXIAL CONNECTOR ASSEMBLY

Robert L. Fisher, Jr., Hummelstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 15, 1986, Ser. No. 907,701
Int. Cl.[4] H01R *17/18*
U.S. Cl. 439—580 18 Claims



1. An electrical connector assembly for connecting a plurality of triaxial cables to a plurality of coaxial cables, said assembly comprising:

a first connector member, said first connector member comprising a first connector insert supported within a first outer shell, said first connector insert having a plurality of apertures extending therethrough;

a triaxial connector supported within each of said plurality of apertures in said first connector insert, each of said triaxial connectors including a center contact, an intermediate contact and an outer contact adapted to be electrically connected to a center conductor, an intermediate conductor and an outer conductor of a triaxial cable; and

a second connector member matable with said first connector member, said second connector member including a second electrically conductive connector insert supported within a second outer shell, said second connector insert having a plurality of apertures extending therethrough;

a plurality of coaxial connectors supported within said apertures in said second connector insert, each of said plurality of coaxial connectors including a center contact and an outer contact adapted to be electrically connected to the center conductor and the outer conductor of a coaxial cable, respectively; and

an insulating tube for supporting each of said plurality of coaxial connectors within said apertures of said second connector insert for electrically insulating each of said coaxial connectors from said second connector insert, said contacts of said coaxial and triaxial connectors being positioned such that upon mating of said first and second connector members, the center contact of each triaxial connector will mate with the center contact of an aligned coaxial connector, the intermediate contact of each triaxial connector will mate with the outer contact of an aligned coaxial connector, and the outer contact of each triaxial connector will engage said second connector insert for providing a grounding path from the outer contacts of each triaxial connector through said second conductive insert and said second outer shell.

4,708,667

CONNECTOR TEST ADAPTER

Craig B. Lindquist, Goodrich, Mich., and Robert F. Bihn, North Olmsted, Ohio, assignors to Kent-Moore Corporation, Warren, Mich.

Filed Mar. 10, 1986, Ser. No. 837,806
Int. Cl.[4] H01R *35/02*
U.S. Cl. 439—788 4 Claims

1. A connector test adapter comprising

a closely wound spring comprising a first portion having one diameter and a second portion having a larger diameter,

a connector tip fastened to the first portion and projecting beyond the end thereof,

said second portion being adapted to function as a banana jack receiving a banana plug,

a plastic premolded insulating sleeve enclosing said spring and engaging the exterior of said first portion of said spring throughout substantially its entire length and the

exterior of said second portion of said spring throughout substantially its entire length,

said sleeve projecting axially beyond the free end of the portion of the spring having the larger diameter, and

means between the interior of said sleeve and the exterior of said spring for inhibiting relative axial movement between the spring and the sleeve.

4,708,668

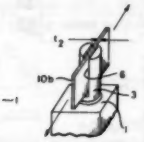
PROCESS OF MANUFACTURING AN IMPROVED ELECTRICAL CONNECTOR AND PRODUCT THEREOF

Le Roy V. Stransky, 425 Covington Rd., Los Altos, Calif. 94022

Filed Mar. 17, 1986, Ser. No. 840,017

Int. Cl.[4] H01R *13/05*

U.S. Cl. 439—825 **6 Claims**



6. an improved electrical connector having cylindrical terminal prongs, said prongs having a diametrical slot therethrough extending along most of the length thus defining two symmetrical elements in each of said prongs and further comprising:

an insert of heat-resisting pre-vulcanized resilient elastomeric material inserted in said slots while said material is under tension;

an adhesive material inserted between the interior surface of said slots and said elastomeric material;

said elastomeric material remaining in a pre-stressed condition while inserted in said slots;

whereby said material exerts a constant pressure upon said elements;

thereby producing improved contact by said prongs.

4,708,669

WARNING DEVICE FOR A WATERCRAFT PROVIDED WITH A PLURALITY OF MARINE PROPULSION ENGINES

Isao Kanno, and Yasuo Yamamoto, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

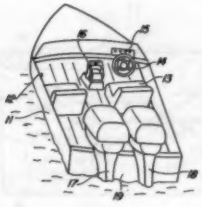
Filed May 30, 1986, Ser. No. 869,134

Claims priority, application Japan, Jun. 1, 1985, 60-119521

Int. Cl.[4] B63B *22/00*

U.S. Cl. 440—1 **45 Claims**

1. In a warning system for a marine propulsion comprising a first engine driving a first propulsion means, a second engine driving a second propulsion means, first sensing means for sensing an abnormal running condition of said first engine, first warning means operated by said first sensing means for providing a warning signal to an operator when said first sensing means senses an abnormal running condition of said first engine, second sensing means for sensing an abnormal running condition of said second engine, second warning means operated by said second sensing means for providing a warning



signal to an operator when said second sensing means senses an abnormal running condition of said second engine, the improvement comprising means for actuating both said first warning means and said second warning means upon the sensing of an abnormal running condition of either of said engines by either of said sensing means.

4,708,670

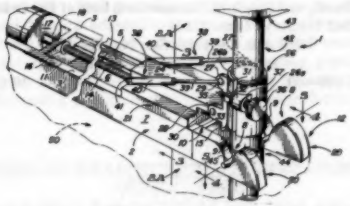
RETRACTABLE TROLLING MOTOR ASSEMBLY

Shelby L. Peters, Rte. 4 Box 215A, West Monroe, La. 71291

Filed Jul. 25, 1986, Ser. No. 889,233

Int. Cl.[4] B63H *21/26*

U.S. Cl. 440—6 **18 Claims**



1. A retractable trolling motor assembly for selectively raising and lowering a trolling motor with respect to a boat, said retractable trolling motor assembly comprising track means mounted on the boat; a threaded drive shaft journalled for rotation in said track means; a slide bracket slidably received by said track means, said slide bracket threadibly engaging said threaded drive shaft; bracket means carrying the trolling motor, said bracket means pivotally attached to said slide bracket; a motor support terminating one end of said track means; a pair of track notches provided in said motor support; and shear pin means carried by the trolling motor, said shear pin means adapted for seating in said track notches when the trolling motor is vertically suspended from said track means, whereby the trolling motor is selectively horizontally retracted on said track means and vertically suspended from said track notches responsive to forward and reverse rotation of said threaded drive shaft.

4,708,671

WATERCRAFT WITH THRUST-REVERSING DEVICE

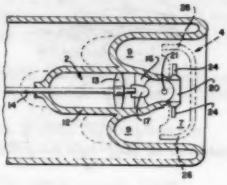
Katumi Watanabe, Akashi, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed May 28, 1986, Ser. No. 867,531

Claims priority, application Japan, May 31, 1985, 60-83101[U]

Int. Cl.[4] B63H *11/11*

U.S. Cl. 440—41 4 Claims



1. A small water craft comprising a hull, a propulsion system on said hull including a nozzle and means for ejecting a jet of water out of said nozzle, a thrust-reversing device pivotably mounted on said hull adjacent said nozzle and movable between an operating position and a retracted position, said device forming a generally U-shaped passage extending substantially laterally of said hull and said passage having concave ends which curve laterally and forwardly, said device when in said operating position being positioned in the path of said jet and directing said jet laterally and forwardly in said passage way, said hull having channels therein generally aligned with said concave ends and conducting said jet generally forwardly when said device is in said operating position, said device when in said retracted position being displaced upwardly out of the path of said jet, said device when in said operating position being no lower than said hull, said hull having a longitudinal centerline, said nozzle and said device being substantially on said centerline, and said channels being symmetrically positioned on opposite sides of said centerline.

4,708,672

BOAT STABILIZER

L. Earl Bentz, and Roark H. Summerford, both of 931 Industrial Rd., Old Hickory, Tenn. 37138

Filed Apr. 18, 1986, Ser. No. 854,402

Int. Cl.[4] B63H *25/48, 5/16*

U.S. Cl. 440—51 10 Claims

1. A boat stabilizer adapted for use with a boat having an outboard motor employing an anti-cavitation plate having a generally horizontal lower surface vertically above a propeller driven by the motor, the stabilizer comprising:

a support detachably attached to the lower surface of the anti-cavitation plate, the attachment providing for adjustable movement of said support in a plane generally parallel to the lower surface;

a generally vertical fin-shaped member extending downwardly from said support and having laterally facing side surfaces for being positioned in response to movement of said support and for receiving a force imparted by moving water in contact with said side surfaces to induce a torque in counteraction to a torque induced by rotation of the propeller in the water; and

a generally horizontally oriented wedge-shaped member formed on said support and extending rearwardly from said support, said member having a lower, generally planar surface, downwardly inclined relative to said anti-cavitation plate, whereby movement of the boat through the water imparts a force against said downwardly inclined surface to induce a torque on said boat substantially eliminating porpoising of the boat as the boat moves through the water.

4,708,673

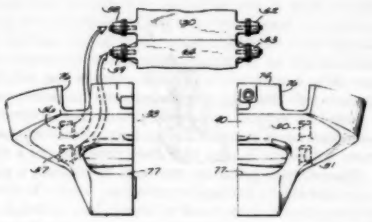
OUTBOARD MOTOR COWL ASSEMBLY

William D. Dunham, Waukegan; John D. Flaig, Libertyville, both of Ill.; H. Norman Petersen, and Robert F. Young, both of Kenosha, Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.

Continuation of Ser. No. 752,144, Jul. 3, 1985, abandoned. This application Jan. 8, 1987, Ser. No. 4,756

Int. Cl.[4] B63H *21/00*

U.S. Cl. 440—77 33 Claims



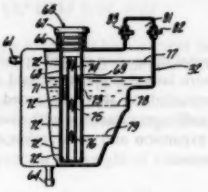
1. An outboard motor comprising a propulsion unit having a front, opposite first and second sides having respective surfaces and including a drive shaft housing including a rotatably mounted propeller, and a drive shaft drivingly connected to said propeller, and a power head mounted on said drive shaft housing and including an internal combustion engine drivingly connected to said drive shaft, a cowl assembly enclosing said power head and including a first cowl member, and a second cowl member, first means for removably and resiliently mounting said first cowl member on said first side of said propulsion unit and including a first aperature having a generally horizontal axis and supported on one of said first cowl member and said first side surface of said propulsion unit rearwardly of said front, and a first resilient mounting member supported on the other of said first cowl member and said first side surface of said propulsion unit rearwardly of said front and received in said first aperature, second means for removably and resiliently mounting said second cowl member on said second side of said propulsion unit and including a second aperture having a generally horizontal axis and supported on one of said second cowl member and said second side surface of said propulsion unit rearwardly of said front, and a second resilient mounting member supported on the other of said second cowl member and said second side surface of said propulsion unit rearwardly of said front and received in said second aperature, and means for releasably connecting together said first and second cowl members to retain said first and second mounting members in said first and second aperatures.

4,708,674

SEPARATE LUBRICATING SYSTEM FOR MARINE PROPULSION DEVICE

Kuniyoshi Matsumoto, Iwata, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Japan

Division of Ser. No. 797,977, Nov. 14, 1985, Pat. No. 4,615,305, which is a division of Ser. No. 610,847, May 16, 1984, Pat. No. 4,572,120. This application Jun. 16, 1986, Ser. No. 874,561
Int. Cl.[4] B63H *21/10*
U.S. Cl. 440—88 5 Claims



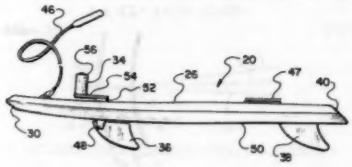
1. In a lubricating system for a two-cycle internal combustion engine for an outboard motor adapted to be supported for steering movement about a generally vertically extending axis and tilting movement about a generally horizontally extending axis, said lubricating system comprising a lubricant delivery tank carried by the engine and moveable about said axes with said engine, and means for delivering lubricant from said delivery tank to the engine lubrication system, the improvement comprising venting means in said delivery tank, said venting means being positioned above the level of lubricant in said delivery tank in all the tilted and steered position of the outboard motor.

4,708,675

STEERABLE SURFING BODY BOARD

David M. Shoeffler, and Paul W. Schoeffler, both of 2 Wild Goose Ct., Newport Beach, Calif. 92663

Filed Jun. 16, 1986, Ser. No. 874,446
Int. Cl.[4] B63H *25/16*
U.S. Cl. 441—65 3 Claims



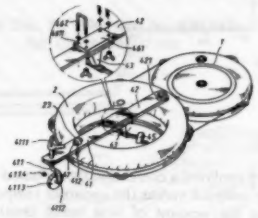
1. A steerable hydroplaning body board, comprising:
a body board having upper and lower surfaces and adapted to supporting a user on said upper surface;
two rudders mounted on said lower surface;
two skags mounted on said lower surface; and
a control means mounted on said upper surface controlling said two rudders having:
a single control handle for controlling both of said two rudders and maintaining said two rudders substantially parallel to each other;
a separate axle for each of said two rubbers passing into said body board substantially perpendicular to said lower surface and parallel to each other;
a pulley on each of said separate axles between said upper and lower surfaces; and
a belt between said pulleys.

4,708,676

MULTI-FUNCTION PAD DEVICE WITH DRIVING MECHANISM

Jinn-Pin Lin, 3rd Fl., No. 29, Alley 25, Lane 109, Mu Cha Rd. Sec. 2, Taipei, Taiwan

Filed Oct. 27, 1986, Ser. No. 923,633
Int. Cl.[4] A63C *15/00*
U.S. Cl. 441—67 3 Claims



3. A multi-function pad device comprising:
a pad member;
a buoy ring member;
a pad sheet member; and
a driving mechanism;
said pad member being constituted by an inner ring and an outer ring;
said buoy ring member being constituted by a ring-shaped inflatable structure, and two symmetrical and parallel auxiliary air chambers on the bottom side of said ring-shaped structure at diametrically opposite positions thereon, projection means around the inside surface of said structure and a bottom ring on the lower inside surface of said ring-shaped structure, said pad member being receivable between said projection means and said bottom ring;
said pad sheet member being constituted by a piece of plastic cloth which can be shaped to convert said pad sheet member into a bag for containing other members of said device for carrying convenience; and
said driving mechanism being constituted by a main frame, a steerable wheel rotatably mounted thereon on which the pad device is adapted to run, means for securing said main frame to said buoy ring member, a pedal seat mounted on said main frame and having a depending portion, and pedal means rotatably mounted on the lower end of said depending portion and having web means thereon.

4,708,677

METHOD OF MEASURING THE TEMPERATURE OF A PHOTOCATHODE

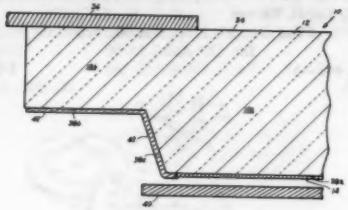
Richard E. Blank, Roanoke; Albert F. Tien, Salem, and Avraham Amith, Roanoke, all of Va., assignors to ITT Electro Optical Products, a division of ITT Corporation, Roanoke, Va.

Filed Dec. 27, 1985, Ser. No. 814,148
Int. Cl.[4] H01J *9/233*
U.S. Cl. 445—3 5 Claims

1. A method of regulating the temperature of a photoemissive cathode structure which includes at least one layer of an infrared transparent material comprising the steps of:
determining the thickness of the infrared transparent material;
subjecting the layered structure to a heat source in an enclosed chamber; arriving at a correction factor by
subjecting a plurality of photoemissive cathodes each having an infrared transparent layer bonded thereto to a predetermined temperature;
measuring the thickness of each layer;
averaging the apparent temperature of each layer and the thickness measurements; and
establishing an apparent temperature corresponding to a

desired actual temperature for a particular layer thickness;

establishing a predetermined actual temperature of the structure by applying a correction factor based on the thickness of the material versus the apparent temperature; and



adjusting the amount of heat being emitted by the heat source to achieve the predetermined temperature.

4,708,678

ADJUSTMENT APPARATUS FOR VIDEO DISPLAY DEVICE AND METHOD THEREFOR

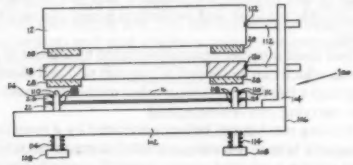
Kurt M. Tischer, Wendlingen; Michael Schlipf, Schorndorf; P. Dieter Lesiak, and Rolf Wengert, both of Munich, all of Fed. Rep. of Germany, assignors to Standard Elektrik Lorenz, Stuttgart, Fed. Rep. of Germany

Filed Jun. 20, 1986, Ser. No. 876,949

Claims priority, application Fed. Rep. of Germany, Jun. 21, 1985, 3522141

Int. Cl.[4] H01J *9/18*

U.S. Cl. 445—24 **14 Claims**



1. An apparatus for the assembly of a video display device comprising, in combination:

a base plate for supporting a plurality of plates within a video display device;

a holding device in mechanical communication with said base plate, said holding device comprising a plurality of adjustable stops for engaging a spacing frame and a screen plate mounted above said plurality of plates;

a plurality of movable adjusting studs projecting from the bottom of said baseplate to the top of said base plate; and

a metal ring fitted to each of a plurality of alignment hoels machined in said plurality of plates, each of said metal rings receiving one of said plurality of adjusting studs from the same direction for providing precise alignment of said video display device.

4,708,679

METHOD OF MAKING SUPPORT MEANS FOR DISCHARGE LAMP TUBES

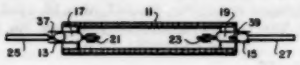
John P. Dunn, Bath; Kent L. Collins, and Norman R. King, both of Hammondsport, all of N.Y., assignors to North American Philips Lighting Corp., New York, N.Y.

Filed Sep. 29, 1986, Ser. No. 912,451

Int. Cl.[4] H01J *9/24*

U.S. Cl. 445—26 **3 Claims**

1. A method of making a support means for the discharge means of a high-pressure discharge lamp including cutting a prescribed length of support wire from a supply of such wire to form said support means, a cut end of said wire being intended for insertion in an opening in a tubular electrode structure formed at one end of said discharge means and flattening said cut end to make it burr-free and of an increased width smaller



than the internal dimension of said opening, said flattened end providing more lateral support for said discharge means than would be provided by the unflattened cut end, said width maintaining sufficient clearance with said opening to allow for operational expansion and contraction of said wire and said discharge means.

4,708,680

COLOR PICTURE TUBE AND METHOD FOR MANUFACTURING THE SAME

Masaharu Kanto; Eiichi Akiyoshi, both of Hyogo, and Yasuhisa Ohtake, Fukaya, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

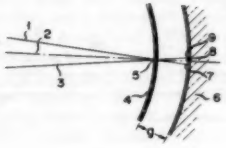
Division of Ser. No. 519,246, Aug. 1, 1983, abandoned. This application Jan. 13, 1986, Ser. No. 818,269

Claims priority, application Japan, Aug. 5, 1982, 57-135720; Aug. 5, 1982, 57-135721; Aug. 5, 1982, 57-135722

The portion of the term of this patent subsequent to Aug. 20, 2002, has been disclaimed.

Int. Cl.[4] H01J *9/00*

U.S. Cl. 445—47 **3 Claims**



1. A method for manufacturing a color picture tube, comprising the steps of:

forming a number of apertures in a sheet consisting of a nickel-containing iron alloy;

annealing said sheet in a vacuum of not more than 10^{-1} Torr at a temperature of not lower than 1,000° C., so as to reduce a content of manganese in said iron alloy to not more than 0.1% by weight, and to render an austenite grain number both within and at surfaces of said sheet to be less than 7, said austenite grain number being defined by JIS G 0551 of the Japanese Industrial Standards;

forming said sheet after annealing to form a shadow mask; and

opposing said shadow mask at a small gap therefrom against a phosphor screen formed on an inner surface of a panel.

4,708,681

METHOD OF MAKING A LONG LIVED HIGH CURRENT DENSITY CATHODE FROM TUNGSTEN AND IRIDIUM POWDERS

Louis E. Branovich, Howell Township, Monmouth County; Gerard L. Freeman, Freehold Township, Alleghany County, and Bernard Smith, Ocean, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 6, 1987, Ser. No. 23,161
Int. Cl.[4] H01J 9/04, 9/12
U.S. Cl. 445—50 5 Claims

5. Method of making a long lived high current density cathode suitable for operation in microwave devices from tungsten and iridium powders including the steps of:

(A) mixing the tungsten and iridium powders in the weight ratio of about 60 weight percent tungsten to about 39 weight percent iridium,

(B) adding about 1 percent by weight of zirconium hydride to the mixture,

(C) ball milling the mixture for about 8 hours,

(D) pressing the ball milled mixture into a billet at about 48,000 p.s.i. in a die,

(E) sintering the billet at about 1800° C. for about ½ hour in dry hydrogen of less than −100 dewpoint,

(F) backfilling the billet with copper in dry hydrogen at about 1150° C.,

(G) machining the billet to the desired geometry,

(H) removing the copper by etching in nitric acid,

(I) thoroughly rinsing in deionized water, methanol and then drying,

(J) firing the billet in dry hydrogen to about 1400° C. for about 15 minutes,

(K) impregnating the billet with a chemical mixture of $6BaO/1SrO/2Al_2O_3$ by firing the billet in a dry hydrogen furnace at about 1550° C. for about 2 minutes,

(L) removing the billet from the furnace after the furnace is cooled, and

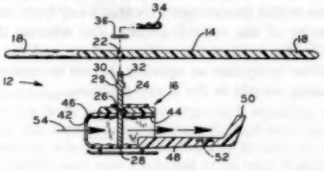
(M) removing any loose pieces of impregnant from the billet.

4,708,682

HELICOPTER TOY

Lawrence M. Schentrup, 402 E. Parkland Ave., Evansville, Ind. 47711

Filed Jul. 31, 1986, Ser. No. 892,710
Int. Cl.[4] A63H 27/00
U.S. Cl. 446—36 8 Claims



1. A helicopter toy comprising:

a hollow body comprising an open ended, elongated conduit;

a generally elongated planar tail member secured to said body, said tail member being vertically arranged in axial alignment with said conduit;

said tail member having a generally planar member secured thereto, said planar member being generally horizontally arranged and at right angles to the plane of said tail member; and

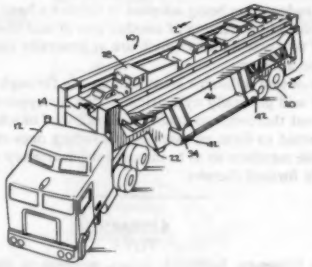
a multi-bladed, boomerang-shaped propeller rotatably secured to said body, whereby said body is suspended from said propeller, and whereby air flows through said conduit during flight of said toy and whereby said body is axially aligned with the flight path of said toy.

4,708,683

TOY CAR CARRIER

Roger W. Lehmann, 18 Flintlock Ct., Bernardsville, N.J. 07924, and Michael I. Satten, 4 Farmers Rd., Kings Point, N.Y. 11024

Filed Oct. 29, 1986, Ser. No. 924,611
Int. Cl.[4] A63H 17/06
U.S. Cl. 446—75 13 Claims



1. A toy car carrier comprising:

a. a toy car transport vehicle,

b. wheels mounted on said vehicle, adapting it to be supported and moved on a supporting surface,

c. support means on said vehicle for supporting toy cars, and

d. a pair of handles mounted on opposite sides of said vehicle for movement upwardly into operative position and downwardly into inoperative position,

e. said handles, when in operative position, being provided with means for confining the toy cars to said support means,

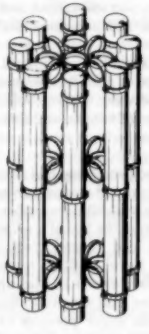
f. said handles, when in operative position, being adapted for carrying the vehicle or for propelling it on its wheels on a supporting surface.

4,708,684

TOY BUILDING BLOCK SET

Chen-Tsung Chen, No. 16, Alley 2, La. 7, Feng-Tung Rd., Fengyuan City, Taichung Hsien, Taiwan

Filed Aug. 12, 1986, Ser. No. 895,863
Int. Cl.[4] A63H 33/08
U.S. Cl. 446—127 4 Claims



1. A toy building block system adapted for assembly to form

a variety of configurations through connecting a plurality of blocks and inflatable members, comprising:

a plurality of blocks and a plurality of inflatable members; each one of said plurality of blocks including a generally cylindrical body adapted to receive a portion of one of said plurality of inflatable members;

each said one of said plurality of blocks having an outer circumference having a plurality of connecting elements and sockets;

ones of said connecting elements including a neck portion and a head portion connected to said neck portion;

ones of said sockets having two side walls contiguous with said outer circumference of said generally cylindrical body, a front wall extending between said two side walls, and an indentation in said front wall;

said indentation being adapted to receive a head portion of a connecting element of another one of said blocks in either of two orientations which are at generally right angles to one another;

ones of said inflatable members passing through at least two of said generally cylindrical bodies in supporting engagement therewith to enable a plurality of blocks to be connected to form an assembly including ones of said inflatable members so as to increase the buoyancy of an assembly formed thereby.

4,708,685

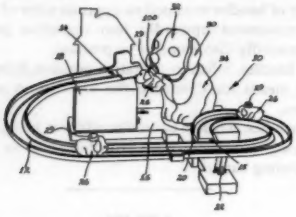
TOYS

Yoshio Udagawa, Ichikawa, Japan, assignor to Blue Box Toy Factory Limited, Hong Kong and Toplay Limited, Japan

Filed May 9, 1986, Ser. No. 861,398

Int. Cl.[4] A63H *33/00, 33/26*

U.S. Cl. 446—139 **7 Claims**



1. A helter-skelter toy comprising:

an elongated track-way, said track-way having an upper end and a lower end and following a generally downwardly directed path from said upper end to said lower end,

a base supporting said track-way,

a number of vehicles each in the shape of a baby animal and each capable of freely running down said track-way from said upper end to said lower end, and each vehicle having an upper portion and a magnet positioned on its upper portion,

a lifting member carried by said base, said lifting member being in the shape of a mother animal, said lifting member being movable between a lower position where it can pick up said baby animal vehicle and an upper position where it can deposit that vehicle back at said upper end of said track-way,

drive means for reciprocating said lifting member between said lower position and said upper position,

magnetic means on said lifting member capable of engaging with said magnet on the top of a vehicle when said vehicle is at said lower end of said track-way and said lifting member is in its lower position to support said vehicle as said lifting member moves to said upper position,

means for retracting said magnetic means once said lifting member is in said upper position to eject a vehicle and release it onto said upper end of said track-way and,

means mounting said lifting member so as to be movable about an upright axis, and in which said drive means includes a first rotatably driven cam and a crank reciprocated by said first cam and engaging said base for the toy on which said lifting member is mounted.

4,708,686

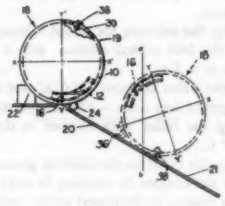
ECCENTRICALLY WEIGHTED ROLLING DEVICE RETURNS UPHILL

Samuel C. Smith, 210 Hartman Rd., Newton Centre, Mass. 02159

Continuation-in-part of Ser. No. 351,114, Feb. 22, 1982, Pat. No. 4,411,096. This application Oct. 17, 1983, Ser. No. 542,681

Int. Cl.[4] A63H *29/10*

U.S. Cl. 446—166 **19 Claims**



1. A gravity actuated return motion rolling device comprising:

a rollable object generally curved convexly on an exterior rolling surface, which rollable object is of light weight;

eccentrically positioned relative to the center of gravity within the rollable object, a relatively heavyweight secured adjacent to an edge of the rolling surface;

a guideway exterior to the rolling object, along which guideway the rolling object is free to roll within a controlled limit;

wherein the rolling object is positioned at rest with the eccentric weight oriented so that when the object is rolled along the guideway within the limit, the eccentric weight will produce a torque in the rolling object to return the rolling object back over the guideway to its original rest position wherein the weight comprises an enclosed container with a movable heavy mass of material contained therein, wherein the container is secured in close proximity to the rolling surface with the center of gravity of the mass within the container located away from the center of gravity of the rollable object, and wherein the weight protrudes beyond the rolling surface and the guideway further comprises an opening therein to receive the protruding weight in the at rest position.

4,708,687

ROLLING FIGURE TOY

Benjamin L. Goldberg, Hartford, and Dominic G. Mercurio, Elmwood, both of Conn., assignors to Coleco Industries, Inc., West Hartford, Conn.

Filed Feb. 7, 1986, Ser. No. 827,794

Int. Cl.[4] A63H *7/00, 3/46*

U.S. Cl. 446—269 **16 Claims**

1. A humanoid figure toy comprised of relatively rigid trunk, thigh, leg and foot members, articulated by joints at hip, knee and ankle locations, said members and joint being constructed to permit folding of said toy from a generally erect posture to a curled configuration with a generally cylindrical

surface contour provided at least in part by surface portions of said trunk and leg members, the axis of said cylindrical contour

extending laterally of said toy and said toy being rollable about said axis.

4,708,688

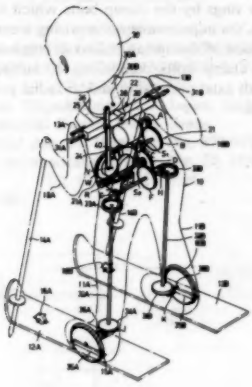
SKIING TOY

Chung-Cheng Lee, No. 31, Show Shan Road, Dan Feng Lee, Shing Chung, Taipei, Taiwan

Filed Jun. 23, 1986, Ser. No. 877,067

Int. Cl.[4] A63H *11/10*

U.S. Cl. 446—288 **2 Claims**



1. A toy comprising:

an upright toy body having two legs each standing on an elongated flat member resembling a ski and each leg having a driving wheel to enable the toy to roll on a flat ground surface and two L-shaped arms each holding an elongated rod resembling a ski pole, each of said arms having an upper part pivotally connected by means of a pivot pin to an upper side of said toy body and capable of making a pivotal movement relative to said toy body;

a driving mechanism within said toy body and operable by an electric motor to cause said driving wheels to rotate; and

an alternating device carried by said toy body, said alternating device including a reduction gear set operable by said electric motor, a pivot lever pivotally mounted within said toy body, and a connecting rod which connects said reduction gear set and said pivot lever to transform rotary motion of said reduction gear set to a reciprocal motion causing said pivot lever to pivot alternating, said pivot lever having two ends with each end respectively extending into said upper part of one of said arms for causing said arms to move alternatingly around their respective pivot pins when said pivot lever is caused to pivot alternatingly;

whereby said poles are caused to alternatingly push the ground causing said upright toy body to tilt sidewardly and the two driving wheels of said skies to alternately lift from the ground and move said toy along a zigzag course.

4,708,689

TOY MUSIC ROCKING CHAIR

Jack Hou, P.O. Box:56-66, Taipei, Taiwan

Filed Oct. 1, 1986, Ser. No. 914,146

Int. Cl.[4] G10K *1/06*

U.S. Cl. 446—301 **2 Claims**

1. A toy music rocking chair including a seat comprising:

(a) a music box supported below the seat, the box including a shaft having a rear end;

(b) a transmission system including an arm, the arm being secured to the rear end of the shaft;

(c) a stub extending from the arm;

(d) a reciprocating plate including a lateral slot for receiving the stub therein whereby rotary motion of the stub can be changed into reciprocating motion of the rod for causing the rocking chair to sway back and forth;

(e) a pair of struts disposed within the box, the struts being provided with grooves for slidably receiving the reciprocating plate therein;

(f) a guide socket on the top of the box;

(g) a doll rocker supported on the seat, the doll rocker including a pair of movable eyelids; and

(h) a reciprocating rod disposed through the guide socket for causing the eyelids to open and close slowly as though the doll rocker is sleepy.

4,708,690

TOY MECHANICAL MONSTER

Ralph J. Kulesza, Chicago; Walter J. Wozniak, Addison, and Harry Disko, South Barrington, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 7, 1986, Ser. No. 827,342

Int. Cl.[4] A67H *13/00, 17/00, 13/08*

U.S. Cl. 446—351 **18 Claims**

1. A toy mechanical monster comprising:

a base housing having a rounded bottom;

motor means mounted within the housing;

the housing having a generally upstanding central axis at an angle to a generally planar playing surface on which the rounded bottom base is supported;

a weight mounted for movement about an axis spaced from the generally central axis;

the motor means driving the weight for eccentric movement to effect movement of the rounded base about the playing surface;

a leg carried by the base housing and extending substantially outside of the housing;

the leg having a free end; and

the free end of the leg being spaced from the playing surface when the generally central axis is substantially vertical.

4,708,691

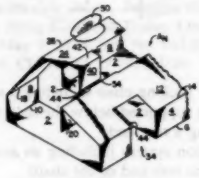
STRUCTURAL BEAM AND BLANK FOR FORMING IT

Robert L. Moore, 424 Great Elm Way, Acton, Mass. 01718

Filed Oct. 7, 1986, Ser. No. 916,204

Int. Cl.[4] A63H *33/00, 33/08*

U.S. Cl. 446—488 **14 Claims**



1. A three dimensional, reinforced, structural beam formed from one piece of sheet material comprising:

a rectangular bottom,

a first rectangular wall joined along one edge of the bottom and extending upwardly at a right angle from the bottom,

a second rectangular wall joined along a second opposite edge of the bottom and extending upwardly at a right angle from the bottom,

a first rectangular top portion joined along an edge of the first rectangular wall and extending parallel to the bottom,

a second rectangular top portion joined along an edge of the second rectangular wall and extending parallel to the bottom,

a first rectangular rib member joined along an edge of the first rectangular top portion and extending at a right angle, downwardly from the first rectangular top portion toward the bottom,

a second rectangular rib member joined along an edge of the second rectangular top portion and extending at a right angle, downwardly from the second rectangular top portion toward the bottom,

at least one notch in a rectangular wall,

at least one member associated with each notch offering structural rigidity between the top and the bottom comprising:

a piece of the rectangular wall contiguous with a piece of the top and a piece of the bottom, each folded inwardly on itself to form together a single, substantially U-shaped member including a single member positioned parallel to the rib members and extending between the top and the bottom and integrally joined to upper and lower extenders lying parallel to and in engagement with the top and the bottom portions respectively.

4,708,692

FLEXIBLE ALL-STEEL SHAFT COUPLING

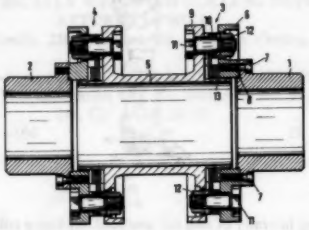
Rudolf Weiss, Vreden, Fed. Rep. of Germany, assignor to Atec-Weiss KG, Vreden, Fed. Rep. of Germany

Filed Nov. 26, 1985, Ser. No. 801,883

Claims priority, application Fed. Rep. of Germany, Nov. 29, 1984, 3443485

Int. Cl.[4] F16D *3/78*

U.S. Cl. 464—69 **7 Claims**



1. In a flexible all-steel shaft coupling comprising a connecting flange for each coupling half, a yieldable stapled lamella crown having bore holes and located in an axially spaced relationship between the connecting flanges, and alternately connected in a circumferential direction by clamp bolts to one or the other of the connecting flanges, wherein the bore holes of the stapled lamella crown are seated on spring collets having tap holes therethrough and the lamella crown clamped between spacer rings by the clamp bolts which extend through the top holes, the improvement comprising means for effecting radial expansion of the spring collets in response to axial tension by the clamp bolts comprising to subject the lamella crown to both axial pretension and to radial pretension at the spring collets.

4,708,693

SLIDING HOMOKINETIC TRANSMISSION JOINT INTENDED FOR MOTOR VEHICLES

Michel A. Orain, Conflans Sainte Honorine, France, assignor to Glaenzer Spicer, Poissy, France

Filed Jun. 12, 1986, Ser. No. 873,402

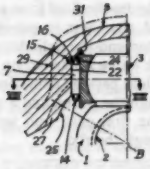
Claims priority, application France, Jun. 14, 1985, 85 09084

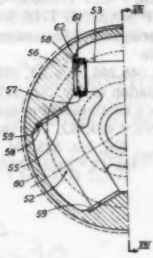
Int. Cl.[4] F16D *3/20;* **F16C** *31/04*

U.S. Cl. 464—111 **24 Claims**

1. Sliding transmission joint intended for motor vehicles, comprising a tripod (1) locked in rotation with a driving shaft (2) and provided with three radial arms (3) capable of sliding axially on flat rolling tracks (22) provided inside a drum (5) locked in rotation with a driven shaft, rows of needle rollers (7) arranged between the arms (3) of the tripod (1) and the rolling tracks (22), and also cages (14) for holding the rows of needles (7), characterized in that the cages (14) have projecting guiding members (16) which are arranged on the side of each cage

(14) which is located closest to the outermost surface of the drum (5), and each of which slide inside a single longitudinal





groove (15) machined in the outer edge of the rolling track (22).

4,708,694

SYSTEM FOR CONTROLLING THE PRESSURE OF OIL IN A SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION

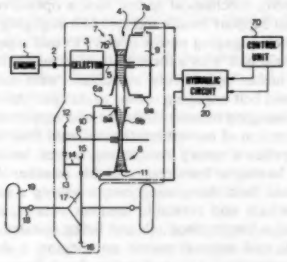
Yasuhito Sakai, Higashimurayama, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 27, 1986, Ser. No. 879,641

Claims priority, application Japan, Jun. 29, 1985, 60-143470

Int. Cl.[4] F16H *11/04*

U.S. Cl. 474—28 **14 Claims**



1. In a control system for a continuously variable transmission for transmitting power of an internal combustion engine, the system comprising a drive pulley having a hydraulically shiftable disc and a first hydraulic cylinder for shifting the disc, a driven pulley having a hydraulically shiftable disc and a second hydraulic cylinder for operating the disc of the driven pulley, a belt engaged with both pulleys, a line pressure control valve having ports and a spool and provided for supplying line pressure, a transmission ratio control valve having ports and a spool, a first hydraulic circuit having a pump for supplying oil to the first hydraulic cylinder through the line pressure control valve and the transmission ratio control valve, wherein the improvement comprises:

a pressure reducing valve communicated with the first hydraulic circuit for supplying the oil with a constant pressure;

a second hydraulic circuit communicating with the pressure reducing valve for applying a control pressure to said spool of the line pressure control valve for urging the said spool of the line pressure control valve to shift;

control valve means provided in the second hydraulic circuit for draining said oil with the constant pressure so as to produce the control pressure applied to the spool of the line pressure control valve;

first means for applying a first pressure to adjacent a first end of said spool of the line pressure control valve so as to urge the spool of the line pressure control in one direction to shift;

spring means for applying a second pressure to adjacent a second end of the spool of the line pressure control valve for urging said spool of the line pressure control valve in another direction; and

said line pressure control valve being disposed so as to increase the line pressure as the amount of draining oil drained by the control valve means decreases.

4,708,695

AUTOMATIC TENSION ADJUSTING MECHANISM FOR WINDING AND TRANSMITTING DEVICE FOR AUTOMATIC DOOR

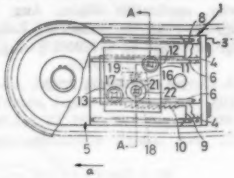
Kiyoaki Sugiyama, Akashi, Japan, assignor to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Nov. 18, 1985, Ser. No. 799,105

Claims priority, application Japan, Aug. 10, 1985, 60-123427[U]

Int. Cl.[4] F16H *7/14*

U.S. Cl. 474—101 **3 Claims**



1. An automatic tension adjusting mechanism for a winding and force transmitting device, said mechanism comprising:

(a) a base (1) having an at least generally planar sliding surface;

(b) a mount (5) having an at least generally planar sliding surface in sliding contact with said at least generally planar sliding surface on said base (1), said mount (5):

(i) being slidable in a first direction (a) relative to said base (1) and in a second direction, opposite to said first direction (a), relative to said base (1) and

(ii) having a saw-toothed stop part (10) extending in a direction parallel to said first direction (a);

(c) a pulley (P_2) carried by said mount (5) for rotation about an axis at least generally perpendicular to said at least generally planar sliding surfaces of said base (1) and said mount (5);

(d) first means (9) biasing said mount (5) in said first direction (a) relative to said base (1);

(e) an engagement piece (16, 27) having a saw-toothed stop part (18), said engagement piece (16, 27) being carried by said mount (5) and being movable relative thereto between a first position in which said saw-toothed stop part (18) on said engagement piece (16, 27) engages said saw-toothed stop part (10) on said mount (5), permitting relative movement between said engagement piece (16, 27) and said mount (5) in said second direction but preventing relative movement between said engagement piece (16,

27) and said mount (5) in said first direction (a), and a second position in which said saw-toothed stop part (18) on said engagement piece (16, 27) does not engage said saw-toothed stop part (10) on said mount (5), permitting relative movement between said engagement piece (16, 27) and said mount (5) in both said first direction (a) and said second direction;

(f) second means (19) biasing said saw-toothed stop part (18) on said engagement piece (16, 27) toward engagement with said saw-toothed stop part (10) on said mount (5);

(g) two holes (23) in one of said base (1) and said engagement piece (16, 27);

(h) a threaded hole (20, 28) in the other of said base (1) and said engagement piece (16, 27) in position to align with one or the other of said two holes (23) in one of said base (1) and said engagement piece (16, 27) when said engagement piece (1, 27) is in its first and second positions, respectively; and

(i) a bolt (21) threaded into said threaded hole (20, 28), said bolt (21) being sized, shaped, and positioned to be received in one or the other of said two holes (23),

whereby three states are selectable, a first locking state wherein said engagement piece (16, 27) is locked in its first position, a second locking state wherein said engagement piece (16, 27) is locked in its second position, and an unlocked state wherein said engagement piece (16, 27) is movable relative to said mount (5) against the bias of said second means (19).

4,708,696

TENSIONER FOR TOOTHED DRIVE BELTS

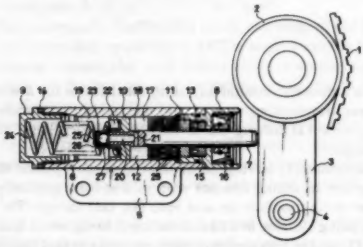
Kazuo Kimura, Tokorozawa, and Masao Maruyama, Hanno, both of Japan, assignors to Tsubakimoto Chain Co., Osaka, Japan

Filed Jun. 11, 1986, Ser. No. 872,928

Claims priority, application Japan, Aug. 30, 1985, 60-131595[U]; Aug. 30, 1985, 60-131591[U]; Aug. 30, 1985, 60-131592[U]; Aug. 30, 1985, 60-131593[U]; Aug. 30, 1985, 60-131594[U]

Int. Cl.[4] F16H 7/12

U.S. Cl. 474—103 **21 Claims**



1. A tensioner for a toothed belt comprising means providing a cylindrical interior wall, a piston slidable within, and substantially conforming to, the cylindrical wall, a rod connected to the piston and extending, substantially along the axis of the interior wall, from the piston to the exterior of the interior wall providing means, packing means surrounding the rod and, with the cylindrical wall and piston, forming a substantially enclosed first chamber on one side of the piston, means cooperating with the interior wall providing means and the piston forming a substantially enclosed second chamber on the opposite side of the piston, hydraulic fluid substantially filling both chambers, a first fluid passage having one-way check valve means allowing flow of hydraulic fluid from one of the chambers to the other as the piston moves in a direction to decrease the volume of said one of the chambers, spring means urging the piston in said direction, means providing a second fluid passage allowing relatively restricted flow of hydraulic fluid from said other chamber to said one of said chambers as the piston moves in the opposite direction;

in which the second fluid passage allowing relatively restricted flow of hydraulic fluid from said other chamber to said one of said chambers is provided by a clearance between the piston and the cylindrical interior wall;

in which the check valve is carried by the piston; and

in which the first fluid passage comprises a first part extending axially through the piston and a second part, communicating with the first part, said second part extending transversly through the rod.

4,708,697

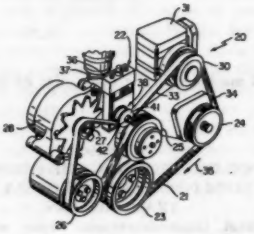
BELT TENSIONER, PART THEREFOR AND METHODS OF MAKING THE SAME

Randy C. Foster, Springfield, Mo., assignor to Dayco Products, Inc., Dayton, Ohio

Division of Ser. No. 646,246, Aug. 31, 1984, Pat. No. 4,601,683, which is a continuation of Ser. No. 391,642, Jun. 25, 1982, abandoned, which is a continuation-in-part of Ser. No. 301,351, Sep. 11, 1981, Pat. No. 4,413,982. This application Jul. 15, 1986, Ser. No. 885,904

Int. Cl.[4] F16H 7/16

U.S. Cl. 474—135 **8 Claims**



1. In a tensioner for a power transmission belt that is adapted to be operated in an endless path, sai tensioner comprising a support means for being fixed relative to said belt, a belt engaging means carried by said support means and being movable relative thereto, mechanical spring means operatively associated with said support means and said belt engaging means for urging said belt engaging means relative to said support means and against said belt with a force to tension said belt, and fluid dampening means operatively associated with said support means and said belt engaging means to dampen the movement of said belt engaging means relative to said support means in at least one direction of movement thereof, said fluid dampening means comprises a rotary dampening means having a fluid therein and having at least one rotatable member disposed in said fluid, said fluid dampening means having a longitudinal axis about which said rotatable member rotates, said spring means having a longitudinal axis and being spiraled about said axis thereof, said support means comprising a shaft means having a longitudinal axis and being fixed from movement relative to said belt engaging means, the improvement wherein said member comprises a flat circular disc-like member having means for creating a shear in said fluid when said disc-like member moved in said fluid, said shaft means carrying said dampening means and said spring means in spaced apart side-by-side relation thereon with said axis of said shaft means being substantially coaxial with said axis of said rotary dampening means and said spring means whereby said rotary dampening means and said spring means are coaxially spaced apart and are coaxially aligned by said shaft means, said belt engaging means having a portion thereof disposed between said rotary dampening means and said spring means and being rotatably carried by said shaft means so as to rotate relative to said shaft means whereby said rotary dampening means and said spring means

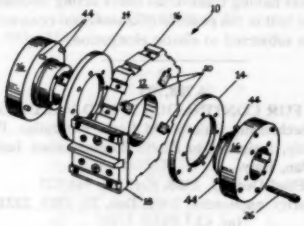
are coaxially spaced apart from each other by said portion of said belt engaging means, said rotary dampening means having a tubular portion rotatably disposed on said shaft means to rotate relative thereto, said portion of said belt engaging means being telescopically disposed on said tubular portion and being operatively interconnected thereto whereby said portions rotate in unison relative to said shaft means, said tubular portion having a part extending beyond said portion of said belt engaging means and being interconnected to said disc-like member to rotate said disc-like member in unison therewith, said rotary dampening means comprising an outer ring member and an inner ring member disposed in said outer ring member, said ring members being arranged for relative rotational movement therebetween, said inner ring member being operatively interconnected to said support means, said outer ring member comprising said part of said tubular portion.

4,708,698

DRIVING SPROCKET FOR CONVEYOR CHAIN ON FINGER JOINTING MACHINES

Harold R. Ziegelmeyer, 5010 Griffen Ck. Rd., Medford, Oreg. 97501

Filed Aug. 11, 1986, Ser. No. 895,506
Int. Cl.[4] F16H *55/30*
U.S. Cl. 474—152 **5 Claims**



1. In a driving sprocket for driving a conveyor chain on finger jointing machines, the combination of
a base plate having a central aperture therein,
drive hub members on both sides of the base plate,
each member being mounted to the base plate in determined relation to the central aperture,
clutch plates on opposite sides of the base plate and operatively interposed between the base plate and the related drive hub member,
said hub members being adapted for connection to conventional power transmission means,
the respective drive hub members being directly connected to the related clutch plate to induce rotation of the latter,
driving teeth elements peripherally mounted on the base plate, and
caliper clutch assemblies to grip the respective clutch plates on opposite sides of the base plate and induce frictional interconnection between the drive hub members and the base plate.

4,708,699

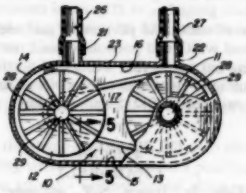
METHOD AND APPARATUS FOR REDUCING SOUND EMANATION FROM A DRIVE SYSTEM

Hiroshi Takano, Miki; Shinichi Takagi, Nishinomiya; Kiyokazu Wada, Miki; Sadaichi Konishi, and Tomizo Kanaoka, both of Kobe, all of Japan, assignors to Mitsuboshi Belting Ltd., Nagata, Japan

Filed Jan. 27, 1986, Ser. No. 822,583
Int. Cl.[4] F16H *57/04*
U.S. Cl. 474—144 **20 Claims**

1. The method of reducing sound emanation from an operating drive system having a drive belt entrained about driver and driven pulleys, comprising the steps of:
substantially fully enclosing the drive system in an enclosure;
absorbing sound inwardly of said enclosure; and causing the drive system to pass air through the enclosure in heat transfer association with said drive system as an incident of operation of the drive system.

6. In a drive system having a drive belt entrained about drive



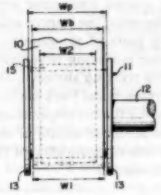
pulleys, apparatus for reducing sound emanation from the operating drive system comprising:
enclosure means for substantially fully enclosing the drive system;
means disposed inwardly of said enclosure for absorbing sound; and
means associated with the drive system for passing air through the enclosure means in heat transfer association with said drive system and sound absorbing means as an incident of operation of the drive/system.

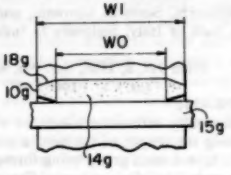
4,708,700

DRIVING FORCE TRANSMISSION MECHANISM USING A TIMING BELT FOR AN INTERNAL COMBUSTION ENGINE

Shizuo Abe, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jul. 22, 1986, Ser. No. 887,928
Claims priority, application Japan, Aug. 27, 1985, 60-129514[U]
Int. Cl.[4] F16G *5/20*
U.S. Cl. 474—205 **16 Claims**





1. A driving force transmission mechanism comprising:
a timing pulley having teeth, each of said teeth having a

width perpendicular to a direction of movement of said teeth; and

a timing belt engaging said timing pulley, said timing belt having teeth, each of said timing belt teeth having a width perpendicular to a direction of movement of said timing belt teeth;

a width of said timing belt not being larger than a width of said timing pulley;

said width of said teeth of said timing belt at dedendums of said teeth being larger than a width of engagement of said teeth of said timing belt with said teeth of said timing pulley;

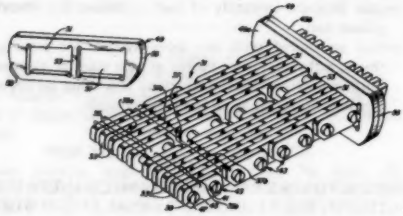
at least one of width end portions of said teeth of said timing pulley and width end portions of said teeth of said timing belt being cut out so that width end portions of said teeth of said timing belt at dedendums of said timing belt do not contact said teeth of said timing pulley.

4,708,701

CHAIN-BELT

Edward H. Cole, Jr., Ithaca, N.Y., assignor to Borg-Warner Automotive, Inc., Troy, Mich.

Filed Sep. 8, 1986, Ser. No. 904,721
Int. Cl.[4] F16G *1/24*
U.S. Cl. 474—245 **10 Claims**



1. In a power transmission chain, the combination of a plurality of links each defining a pair of longitudinally spaced apertures on a longitudinal center line therefor, each aperture having an axis of symmetry, one of the apertures in each link being transversely aligned with an aperture in the next adjacent link to form transverse rows of aligned apertures, and pivot means received in each row of apertures, said pivot means defining spaced transverse articulation axes which are parallel to one another, the improvement comprising said pivot means including pairs of asymmetric pins in the apertures of the link, with one pin being reversed relative to the other pin to provide facing rocking surfaces, at least one of said pairs of pins having a symmetrical back surface with an axis of symmetry coincident with the corresponding aperture axis of symmetry, wherein the center of action of each said rocking surface is offset from the axis of symmetry of the aperture in which said respective pin is seated.

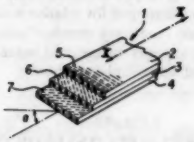
4,708,702

V-BELT OF CONTROLLED EXTENSIBILITY AND RELATIVE TRANSMISSION

Edoardo Robecchi, Sesto S. Giovanni, and Renato Dell'Orto, Seregno, both of Italy, assignors to Industrie Pirelli S.p.A., Italy

Filed Jul. 8, 1986, Ser. No. 883,365
Int. Cl.[4] F16G *5/08*
U.S. Cl. 474—261 **19 Claims**

1. An elastically extensible V-belt, of variable length comprising, along the length of the belt, a plurality of groups of elastomeric layers, each group being formed by three layers in which are embedded discontinuous fibers, one of said layers having fibers directed transversally to the longitudinal direction of the belt; the other two layers having fibers inclined in mutually opposite directions with respect to the longitudinal direction of the belt, the angle of inclination of the fibers of said other two layers to said longitudinal direction being at most 45°; the fibers of the three layers of each group forming a reinforcing structure comprising a plurality of triangles whose sides meet one another substantially in direct contact thus determining the vertices of the trangles; the Young's moduli of the layers of each group having said inclined fibers, measured in the longitudinal direction of the belt, being equal to each other and the Young's modulus of the belt being substantially



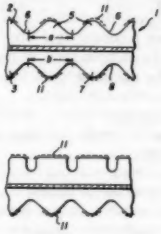
uniform across the transversal section; said elastomeric layers and embedded discontinuous fibers constituting the only longitudinal reinforcement of said belt, said belt thus being devoid for its entire length of longitudinal, continuous and inextensible reinforcements such as cords, wires, filaments so that the entire cross-sectional area of said belt is always working under traction; said layers having transversal fibers acting to control the stability of the belt in the pesence of transversal contractions in the belt when subjected to elastic elongation.

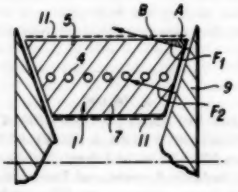
4,708,703

V-BELT FOR CONTINUOUS SPEED VARIATORS

Vincenzo Macchiarulo, Chieti, and Carlo Fiordaliso, Pescara, both of Italy, assignors to Pirelli Transmissioni Industriali S.p.A., Milan, Italy

Filed Dec. 22, 1986, Ser. No. 944,527
Claims priority, application Italy, Dec. 20, 1985, 23317 A/85
Int. Cl.[4] F16G *5/10*
U.S. Cl. 474—268 **14 Claims**





1. A V-belt for continuous speed-variators having a first and second grooved pulley, comprising:

a belt body;

a plurality of parallel inextensible inserts mounted in said

belt and oriented in a longitudinal direction of said belt body, upper and lower portions of said belt body comprising a first and second group of teeth, each of said first and second groups of teeth including first and second teeth having a groove formed therebetween, said belt body including opposite flanks for contacting with corresponding surfaces of grooves of said first and second grooved pulleys; and

a plurality of stiffening elements disposed transverse to the belt body and positioned on each of said teeth of said first and second groups of teeth, said stiffening elements covering at least part of an outer surface of each of said teeth between opposite flanks of said belt body, and said stiffening elements having a greater modulus of rigidity than that of said elastomeric material of said belt body, wherein said teeth of said first and second groups of teeth are opposed to one another and have an equal base surface.

4,708,704

PROCESS FOR PRODUCING PACKS WITH ROUNDED OR BEVELLED EDGES

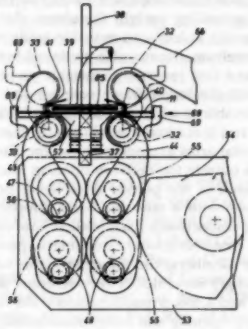
Heinz Focke, Verden, and Hugo Mutschall, Kirchlintein, both of Fed. Rep. of Germany, assignors to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany

Filed Apr. 22, 1986, Ser. No. 854,958

Claims priority, application Fed. Rep. of Germany, May 2, 1985, 3515775

Int. Cl.[4] B31B *3/28*

U.S. Cl. 493—151 **10 Claims**



1. Process for producing cigarette hinge lid packages, having a pack part (13) and a lid (14), from one common longitudinally-extending blank (11) with areas for the forming of a front wall (15), a bottom wall (16), a rear wall (17) and narrow side walls from pack side tabs (18, 19) folded over each other, as well as a lid top wall (22), a lid front wall (23), a lid rear wall (21), and lid side walls from lid side tabs (26, 27) folded over each other, characterized by the following steps:

fixing the spread-out blank (11) in a shaping station (31) by lowering a shaping plate (39, 95) from above onto the blank (11);

choosing the shaping plate (39, 95) to have the total length of the front wall (15), bottom wall (16), rear wall (17), lid rear wall (21), top wall (22) and lid front wall (23) areas of the blank;

after lowering of the shaping plate (39, 95) onto the blank (11), moving fixed longitudinally folding rollers (32, 33; 100, 101), rotatable about axes extending in the longitudinal direction of the blank (11) while resting against it, from a position below the shaping plate (39, 95) to a position around lateral shaping edges (40, 41 or 96, 97) of the shaping plate, and pressing the blank (11) against the shaping edges (40, 41 or 96, 97); and

selecting the shaping edges (40, 41; 96, 97) to be rounded in an arc shape, or beveled.

2. Process for producing cigarette hinge lid packages, having a pack part (13) and a lid (14), from one common longitudinally extending blank (11) with areas for the forming of a front wall (15), a bottom wall (16), a rear wall (17) and narrow side walls from pack side tabs (18, 19) folded over each other, as well as of a lid top wall (22), a lid front wall (23), a lid rear wall (21), and lid side walls from lid side tabs (26, 27) folded over each other, characterized by the following steps:

fixing the spread-out blank (11) in a shaping station (31) by lowering a shaping plate (39, 95) from above onto the blank (11);

choosing the shaping plate (39, 95) to have the total length of the front wall (15), bottom wall (16), rear wall (17), lid rear wall (21), top wall (22) and lid front wall (23) areas of the blank;

after lowering the shaping plate (39, 95) onto the blank (11), moving folding strips (103, 104) from a position below the shaping plate laterally against lateral shaping edges (96, 97) of the shaping plate, while taking along and shaping of the pack side tabs (18, 19) and the lid side tabs (26, 27) of the blank (11); and

choosing the shaping edges (96, 97) to be rounded in an arc shape, or beveled.

4,708,705

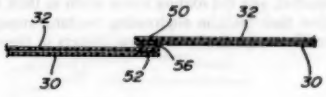
REINFORCED PLASTIC BAG

Paul E. Aubry, 361 Rue Baillargeon, Cap-de-la-Madeleine, Quebec, Canada (G8T 6K9), and Josef Poklukar, 520 Logan Avenue, St. Lambert, Quebec, Canada H9P 2R3

Continuation-in-part of Ser. No. 578,429, Feb. 9, 1984, abandoned. This application Feb. 3, 1986, Ser. No. 825,586

Int. Cl.[4] B31B *23/62, 23/72, 23/84*

U.S. Cl. 493—211 **10 Claims**



1. A method of forming a plastic bag having a reinforced seam area from double wall tubing comprising the steps of feeding at least first and second layers of a thermoplastic sheet material into proximity to each other, said first and second layers having their side edges generally in alignment, extruding a layer of reinforcing material on at least one facing surface of at least one layer of sheet material at each side edge thereof in a continuous in-line operation, said layer of reinforcing material being extruded in the form of a band of a predetermined width and thickness which is sufficient to form and function as a reinforcing layer to reinforce the adjoined edges juxtaposing and adhering said side edges together such that said first and second layers of sheet material form a double wall structure having said first and second layers spaced apart at their edges by said layer of reinforcing material and where the layer of reinforcing material still retains sufficient width and thickness after adhering said side edges together to function as a reinforcing layer in the bag, folding one of said pair of adhered edges over to form a double wall tube with said adhered edges overlapping each other, extruding a further layer of reinforcing material on a facing surface of at least one of said overlapped edges, and securing said overlapped edges together along at least a portion of the length of said secured edges overlapped to thereby form a tubing structure having four layers of overlapped sheet material with a reinforcing layer intermediate each adjacent sheet material.

4,708,706

APPARATUS FOR SHAPING WRAPPERS FOR PACKAGES

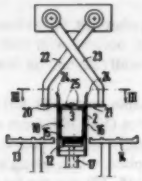
Gerhard Doderer, Marbach/Neckar; Heinz Kiefer, Stuttgart, and Willi Krieger, Korb, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Sep. 9, 1986, Ser. No. 905,202

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1985, 3541821

Int. Cl.[4] B31B *31/28, 35/32*

U.S. Cl. 493—295 **6 Claims**



1. An apparatus for shaping wrappers for packages from a blank of foldable packaging material, having a shaping mandrel (10), having a table for receiving a flat blank (1), a die (12) that forces a portion of said flat blank against one side of said shaping mandrel that includes side walls, two lateral folders, (15, 16) that are movable from a lower position to an upper position alongside said die to erect side portions of the blank upward against the side walls of said shaping mandrel, two folding slides (20, 21) that move relative to each other to folding positions to fold portions of the blank that protrude beyond the shaping mandrel over onto a top side of the shaping mandrel, said lateral folders (15, 16) and folding slides each being of comblike fashion including teeth (24, 25, 26) with gaps therebetween, the teeth of the lateral folders when said laterial folders are in an upper position protruding beyond the top of the shaping mandrel, and the folding slides when in their folding position have their teeth in altelrnating meshing engagement with the teeth and gaps of said lateral folders in their upper positions.

4,708,707

BLANK FEEDER FOR PACKAGING MACHINE

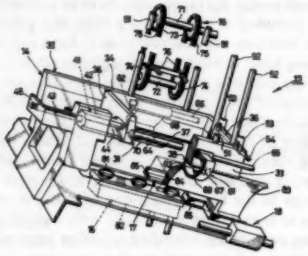
Mitsuhiro Koike; Yoshihiro Saijo, and Tadaaki Kume, all of Tokushima, Japan, assignors to Shikoku Kakooki Co., Ltd., Tokushima, Japan

Filed Dec. 9, 1986, Ser. No. 939,831

Claims priority, application Japan, Aug. 20, 1986, 61-196002

Int. Cl.[4] B31B *5/06, 3/78*

U.S. Cl. 493—313 **5 Claims**



1. A blank feeder for a packaging machine for use with a plurality of kinds of folded flat blanks unfoldable into tubes of square to rectangular cross section and having different lengths to form containers of the same cross sectional area but varying heights so as to have different capacities, the blank feeder comprising:

a magazine for containing a multiplicity of flat blanks in a stack, the magazine having at its lower end a frame defining a downward delivery opening, the frame comprising a pair of side frame members arranged in parallel with each other and each inclined downward from its one end toward the other end thereof, a lower frame member :nterconnecting the lower ends of the side frame members and an upper frame member extending between the side frame members in parallel with the lower frame member at a position close to the upper ends of the side frame members and movable longitudinally of the side frame members,

the side frame members being spaced apart from each other by a distance slightly larger than the distance between the opposite side edges of the blank, the side frame members being respectively provided on their bottom surfaces with a pair of fixed blank supports partly projecting into the delivery opening and spaced apart from each other by a distance slightly smaller than the distance between the opposite side edges of the blank,

the lower and upper frame members being respectively provided on their bottom surfaces with a pair of blank unfolding pawls partly projecting into the delivery opening, the frame having means for moving the upper frame member for the blanks of different lengths to be accommodated in the magazine so that the end-to-end distance of the blank unfolding pawls will be slightly smaller than the distance between the opposite ends of the blank,

each of the side frame members having at least one fixed guide rod extending upright therefrom, the lower frame member having at least one movable guide rod extending upright therefrom, the movable guide rod being fixed at its base end to a first reversibly rotatable pivot extending in parallel with the lower frame member and being downwardly movable to a fallen position in which the forward end of the rod is at a lower level than the base end thereof,

a pair of pivotal arms extending below the fixed blank supports from outside the delivery opening into the delivery opening, each of the pivotal arms being provided at its forward end with a movable blank support the pivotal arms being respectively fixed at their base ends to second reversibly rotatable pivots extending in parallel with the side frame members, the movable blank supports being reciprocatingly movable between an upper position above the frame and a lower position below the frame through the delivery opening and being positionable, when in the upper position, at a higher level than the base end of the movable guide rod in the fallen position,

the magazine having an elevator for moving the blanks upward and downward within the magazine and delivering at the lower limit of its downward movement the blanks to the movable blank supports in the upper position.

4,708,708

METHOD AND APPARATUS FOR SKIVING AND HEMMING

Carl J. Fries, Jr., Holland, Pa., assignor to International Paper Company, Purchase, N.Y.

Division of Ser. No. 745,569, Jun. 17, 1985, Pat. No. 4,617,211, which is a division of Ser. No. 447,104, Dec. 6, 1982, Pat. No. 4,540,391. This application Jun. 30, 1986, Ser. No. 880,614

Int. Cl.[4] B31B *1/14, 3/64, 43/00*

U.S. Cl. 493—357 **4 Claims**

1. An apparatus for skiving and hemming a workpiece of paperboard stock or the like having a paperboard layer and an exterior layer of heat sealable material, said apparatus comprising:

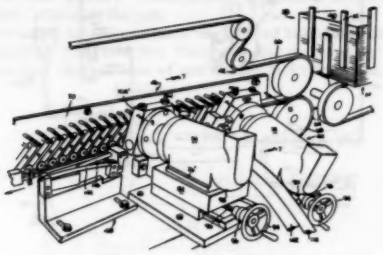
conveyer and hold-down means for moving the workpiece through the apparatus;

first and second skiving means located at stations along said

conveyer and hold-down means for skiving the heat sealable exterior layer of the workpiece generally parallel to an edge of the workpiece to form a skived edge portion;

one of said skiving means being for making a flat surface substantially parallel to the heat sealable layer and the other of said skiving means being for making an oblique surface, said flat and oblique surfaces being substantially adjacent to one another;

heating means for heating a portion of the exterior layer of heat sealable material adjacent the skived edge portion of the workpiece;



hemming means for folding and sealing a part of the skived edge portion of the workpiece over onto the heat sealable layer to form a wedge-shaped sealed edge portion;

ironing means for making the folded-over, heat sealed part substantially flush with the heat sealable layer; and

wedge-shifting means for shifting the wedge-shaped sealed edge portion of the workpiece from a first configuration in which the edge portion has a surface continuous with and oblique to the heat sealable layer, to a second configuration, in which the edge portion surface is substantially flush with the heat sealable layer.

4,708,709

METHOD AND APPARATUS FOR THE INFINITELY VARIABLE SETTING OF THE TAILS U^{235} CONCENTRATION OF GAS CENTRIFUGE CASCADES FOR THE SEPARATION OF URANIUM ISOTOPES

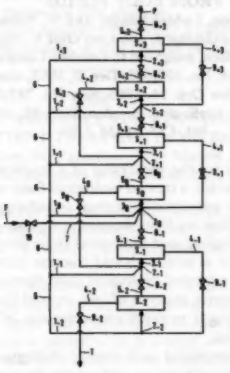
Robert Zeller, Langerwehe, Fed. Rep. of Germany, assignor to Uranit GmbH, Jülich, Fed. Rep. of Germany

Filed Jun. 15, 1984, Ser. No. 621,367

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1983, 3321823

Int. Cl.[4] B04B *5/02, 7/00*

U.S. Cl. 494—32 **8 Claims**



1. A process for concentrating U^{235} in a mixture of gaseous uranium isotopes using a multiple stage centrifuge cascade having a feed, a product and a tails stream, in which each centrifuge stage has a feed, product and tails header; wherein the U^{235} concentration in the tails stream is infinitely variable and a predetermined U^{235} concentration in the product stream is maintained by adjusting the U^{235} concentration in the tails stream according to the volume and U^{235} concentration of the feed stream mixture of gaseous uranium isotopes; said multiple stage cascade having choke valves on the product and tails headers of each stage; wherein said multiple stage cascade is interconnected such that the product header of each preceeding stage is connected to the feed header of the next stage in the direction of U^{235} enrichment, the tails header of each stage is connected to the feed header of the preceeding stage, and the feed headers of all stages are interconnected to equalize the pressures in all feed headers; comprising:

(a) introducing the cascade feed, the mixture of gaseous uranium isotopes from which the U^{235} is to be concentrated, into the feed header of an intermediate stage;

(b) equalizing the pressure in the feed header of each stage to the pressure of the cascade feed in (a) above; and

(c) maintaining the predetermined U^{235} product concentration by manipulating the choke valves on the product or tails streams from each stage, or the choke valve on the cascade feed stream to vary the ratio between the cascade feed and the cascade product stream to adjust the U^{235} concentration in the tails.

4,708,710

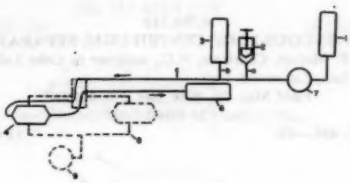
PARTICLE SEPARATION PROCESS

George F. Dunn, Jr., Wenonah, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 27, 1986, Ser. No. 844,959

Int. Cl.[4] B01D *21/26;* **B04B** *11/00*

U.S. Cl. 494—37 **32 Claims**



1. A process for separating preselected particles from a mixture containing the particles, comprising:

supporting the mixture in a centrifuge chamber;

subjecting the chamber to a centrifugal force; and

forcing a displacing fluid through the chamber, against the centrifugal force, thereby separating the preselected particles from the mixture;

wherein the displacing fluid has a density greater than or equal to the density of the preselected particles.

4,708,711

PRESSURE CENTRIFUGE

Manfred Scherer, Pfaffenhofen, Fed. Rep. of Germany, assignor to Krauss-Maffei A.G., Fed. Rep. of Germany

Filed Nov. 7, 1986, Ser. No. 928,097

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1985, 3539694

Int. Cl.[4] B04B *1/20, 15/02, 7/08, 9/00*

U.S. Cl. 494—41 **14 Claims**

1. A pressure centrifuge comprising:

a pressure housing;

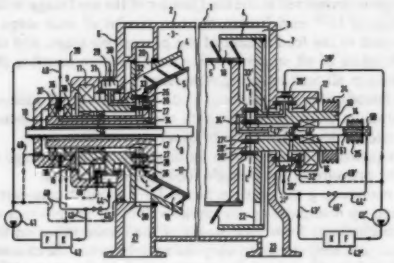
a first rotating drum element bearingly mounted at first bearing zones within said pressure housing;

a first seal between said first rotating drum element and said pressure housing at said first bearing zones;

a second, independently rotating drum element, bearingly mounted at second bearing zones, within said first drum element;

a second seal between said first drum element and said second drum element at said second bearing zones;

a double seal between said first and second rotating drum elements arranged between said second seal and an internal process chamber, and exhibiting an internal and external seal element, wherein said internal seal element is a rotating mechanical seal;



a separate sealing chamber defined between said internal and external seal elements;

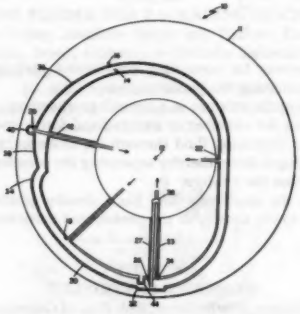
means for cooling and lubricating said double seal including a circulation loop comprising means for connecting a first rotating feed sleeve disposed in said first drum element to said separate sealing chamber and means for connecting a second rotating feed sleeve disposed in said second drum element to said separate sealing chamber.

4,708,712

CONTINUOUS-LOOP CENTRIFUGAL SEPARATOR

Alfred P. Mulzet, Charlotte, N.C., assignor to Cobe Laboratories, Inc., Lakewood, Colo.

Filed Mar. 28, 1986, Ser. No. 845,847
Int. Cl.[4] B04B *7/08*
U.S. Cl. 494—45 **11 Claims**



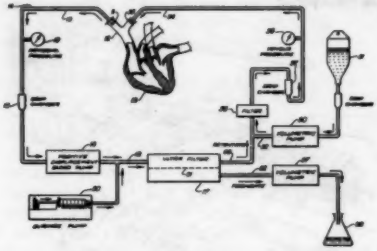
1. Centrifuge apparatus for use in separating a heavy phase from a light phase in a rotating bowl, said apparatus comprising means defining a closed channel forming a continuous open loop so as to permit uninterrupted flow of liquid therearound in both directions without a barrier and having an inlet, a first outlet, and a dam portion spaced along said channel from said inlet and having an inner wall radius that is greater than that of adjacent portions so as to provide a heavy phase dam region which can be completely filled with separated heavy phase so as to prevent separated light phase from flowing past it.

4,708,713

METHOD AND SYSTEM FOR REMOVING IMMUNOSUPPRESSIVE COMPONENTS FROM THE BLOOD OF MAMMALS

M. Rigdon Lentz, Irvine, Calif., assignor to Anisa Medical, Inc., San Diego, Calif.

Filed Nov. 16, 1984, Ser. No. 671,990
Int. Cl.[4] A61M *37/00*
U.S. Cl. 604—5 **13 Claims**



1. A method of extracorporeally treating a mammalian patient having a dysfunction of the immune system thereof wherein immunosuppressive components having molecular weights less than 200,000 Daltons retard or prevent immune system response, the method including a plurality of treatments with each treatment comprising:

(a) withdrawing whole blood comprising a cellular fraction and a plasma fraction from a patient having such a dysfunction;

(b) selectively separating from the withdrawn whole blood components of the plasma fraction with molecular weights less than 200,000 Daltons including the immunosuppressive components which retard or prevent immune system response to the immune system dysfunction; and

(c) returning to the patient whole blood from which the components of the plasma fraction have been separated; and

(d) continuing the treatment until the concentration of immunosuppressive components with molecular weights less than 200,000 Daltons in the extracellular fluid of the patient are reduced to a level sufficient to initiate an immune system response.

4,708,714

APPARATUS FOR THE SEPARATION OF FRACTIONS FROM BODY FLUIDS

Lars-Ake L. Larsson, Loddekopinge; Ake W. Nilsson, Kavlinge; Bo Ingemar W. Johannson, and Lars Olof V. Naucler, both of Lund, all of Sweden, assignors to Gambro Lundia AB, Sweden

Continuation of Ser. No. 557,606, Dec. 2, 1983, abandoned. This application Oct. 11, 1985, Ser. No. 787,009
Claims priority, application Sweden, Dec. 10, 1982, 8207078
Int. Cl.[4] A61M *1/03*
U.S. Cl. 604—5 **7 Claims**

1. An apparatus for the separation of a fraction from a biological fluid to provide a treated biological fluid to be supplied to a patient, said apparatus utilizing an adsorption column having an adsorption medium thereon comprising:

(a) means for feeding said biological fluid into said adsorption column so as to adsorb said fraction into said column and produce a treated biological fluid therein;

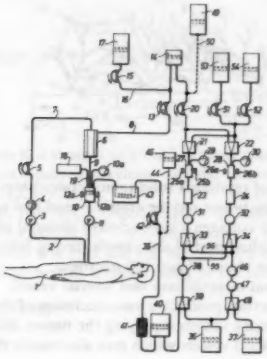
(b) means for coarse analysis of said treated biological fluid for determining a primary characteristic of said treated biological fluid;

(c) means for supplying said treated biological fluid from said adsorption column to said means for coarse analysis, said means for supplying said treated biological fluid including a removable, disposable portion through which

said treated biological fluid flows and arranged within said means for coarse analysis, said disposable portion having walls separating said treated biological fluid from said means for coarse analysis and through which said means for coarse analysis is operative for determining said primary characteristics of said treated biological fluid, whereby said disposable portion can be replaced while retaining said means for coarse analysis;

(d) primary valve means positioned downstream of said means for coarse analysis for selectively directing said treated biological fluid to first or second fluid paths based upon said primary characteristic determined by said means for coarse analysis;

(e) first means for fine analysis of said treated biological fluid associated with said first fluid path for determining a secondary characteristic of said treated biological fluid;



(f) first secondary valve means positioned downstream of said first means for fine analysis for selectively directing said treated biological fluid to third or fourth fluid paths based upon said secondary characteristic determined by said first means for fine analysis, said third fluid path supplying said treated biological fluid to a patient;

(g) second means for fine analysis of said treated biological fluid in fluid communication with said second fluid path for determining a secondary characteristic of said treated biological fluid; and

(h) second secondary valve means positioned downstream of said second means for fine analysis for selectively directing said treated biological fluid to fifth or sixth fluid paths based upon said secondary characteristics determined by said second means for fine analysis,

said means for coarse analysis comprising a detector for monitoring a degree of dilution of said treated biological fluid.

4,708,715

LIGHT ARRAY ASSEMBLY FOR PHOTOACTIVATION PATIENT TREATMENT SYSTEM

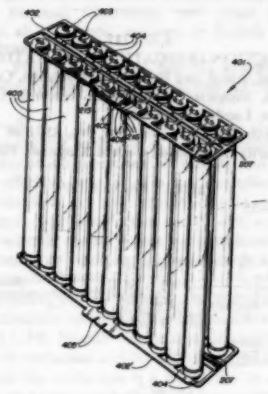
Vernon H. Troutner, St. Petersburg, and Martin J. King, Seminole, both of Fla., assignors to McNeilab, Inc., Fort Washington, Pa.

Continuation-in-part of Ser. No. 665,833, Oct. 29, 1984, Pat. No. 4,578,056. This application Feb. 27, 1986, Ser. No. 834,256

Int. Cl.[4] A61M *37/00*; **H05K** *1/00*

U.S. Cl. 604—6 **6 Claims**

1. A light array assembly for use in a patient treatment system for altering cells including treating the cells with a photoactivatable agent and irradiating said cells and said agent whereby said agent is caused to be activated and to affect said cells, said agent and said cells during irradiation being contained in an irradiation chamber, comprising a top printed circuit board and a bottom printed circuit board having mounted therebetween and connected thereto a plurality of radiation sources for providing photoactivating illumination, each of said printed circuit boards having a plurality of



contacts adapted to receive power for energizing said radiation sources.

4,708,716

TRANSDERMAL DRUG APPLICATOR

Dan Sibalis, Stony Brook, N.Y., assignor to Drug Delivery Systems Inc., New York, N.Y.

Continuation-in-part of Ser. No. 524,252, Aug. 18, 1983, Pat. No. 4,557,723, and a continuation-in-part of Ser. No. 660,192, Oct. 12, 1984, Pat. No. 4,622,031. This application Sep. 16, 1985, Ser. No. 778,183

Int. Cl.[4] A61N *1/30*

U.S. Cl. 604—20 **24 Claims**

1. A transdermal drug applicator for application to the body for migration of medicament through the skin to the blood stream of a patient comprising:

reservoir means containing at least one medicament, battery means for supplying a current to said applicator and being close to said reservoir means for charging/driving the medicament, means for covering comprising an electrically conductive material for partially enclosing at least said reservoir means leaving the side of said reservoir means opposite that of said battery means exposed for contacting said skin, means for electrically connecting the battery means to the cover means, said cover means having lip means for making contact with said skin when mounted on said skin leaving at least said reservoir means substantially fully enclosed, an electrically conductive adhesive material coating disposed on a side of said lip means in contact with the skin when in use, and a sensing electrode and circuit means in a feedback loop mounted on said skin when in use and connected with said electrical circuit for sensing a predetermined chemical in said body and providing a control signal for regulating drug dosage at a desired level, said applicator being generally conformable to the body contour of said patient, whereby when said applicator is adhered to and mounted on said skin a complete electrical circuit through said skin is formed and a medicament in said reservoir means migrates out of said reservoir means and through said skin into the blood

stream of said patient, due to the mass transfer activity attributed to at least one phenomena selected from the group consisting of electrophoresis and electro-osmosis.

4,708,717

SUCTION-IRRIGATION APPARATUS

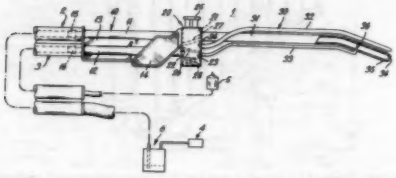
Graham Deane, Ascot, and Barry O. Weightman, Cobham, both of England, assignors to National Research Development Corporation, London, England

Filed Feb. 25, 1986, Ser. No. 832,768

Claims priority, application United Kingdom, Feb. 26, 1985, 8504906

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—35 **7 Claims**



1. Suction-irrigation apparatus comprising: a handpiece; a probe projecting from said handpiece to terminate in an opposite tip; a suction conduit extending through said apparatus to open at one end from said handpiece for connection to a source of suction and at the other end at said operative tip; first and second irrigation conduits each extending through said apparatus to open at one end from said handpiece for connection to a supply of irrigating fluid, said first conduit opening at its other end at said tip, and said second conduit being communicated at its other end with said suction conduit adjacent said tip; and valve means carried by said handpiece to control the supply of irrigating fluid to said first and second conduit other ends, said valve means including a manually operable valve member selectively movable between first, second and third operable positions in which, respectively, both and first and second conduits are closed, said first conduit is closed while said second conduit is open, and said first conduit is open while said second conduit is closed.

4,708,718

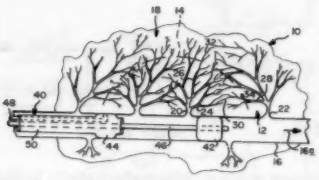
HYPERTHERMIC TREATMENT OF TUMORS

John R. Daniels, Pacific Palisades, Calif., assignor to Target Therapeutics, Los Angeles, Calif.

Filed Jul. 2, 1985, Ser. No. 751,605

Int. Cl.[4] A61M *31/00*

U.S. Cl. 604—53 **15 Claims**



1. A method of treating a solid tumor comprising:

a. localizing the tumor and the arterial vessel that supplies it,

b. providing a collagen vaso-occlusive material adapted to produce occlusion of blood vessels having lumen diameters between about 10 and 150 microns,

c. injecting said material into said arterial vessel,

d. by said injecting, producing vaso-occlusion of the secondary and tertiary vessels supplying the tumor, distal to the collateral blood vessels which may also supply the tumor, and

e. heating the tumor under conditions which produce tissue necrosis selectively in the occluded tumor tissue.

4,708,719

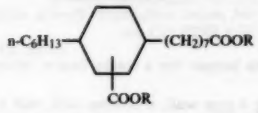
DISPERSE DYE COMPOSITION FOR USE IN SOLVENT DYEING

Robert B. Wilson, Greenville, S.C., and William F. Pomeroy, Rocky Mount, N.C., assignors to Crucible Chemical Company, Greenville, S.C.

Filed Nov. 8, 1984, Ser. No. 669,352
Int. Cl.[4] C09B 67/00
U.S. Cl. 8—580 17 Claims

1. A non-aqueous disperse dye concentrate composition for use in non-aqueous solvent systems, employing a disperse dye, comprises 10–95% by weight of dry disperse dye, free of water-soluble dispersing agents, admixed with 90–5% by weight of one or more of:

(A) a cycloaliphatic diester of the formula



I

wherein R is straight or branched chain alkyl of 4–20 carbon atoms, polyoxyalkylene of the formula $HO(CH_2CH_2O)_nCH_2CH_2$—, $HO(C_3H_6O)_nC_3H_6$—, $HO(CH_2CH_2)_p(C_3H_6O)_qC_3H_6$— or $HO(C_3H_6O)_p(CH_2CH_2O)_qCH_2CH_2$— or phosphated polyoxyalkylene, wherein n is 2–22 and the sum of p+q is n;

(B) a high boiling aromatic ester of the formula

$$ArCOOR_2 \quad II$$

or

$$ArCOO—R_1—OOCAr \quad III$$

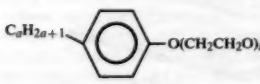
wherein R_1 is alkylene of 2–8 carbon atoms or polyoxyalkylene of the formula $—C_rH_{2r}(OC_rH_{2r})_s—$, in which r is 2 or 3 and s is 1 to 15; R_2 is substituted or unsubstituted alkyl or alkenyl of 8–30 carbon atoms and Ar is substituted or unsubstituted mono- or bicyclic aryl of up to 15 carbon atoms; or

(C) a high boiling alkylphenol ester of an aliphatic or aromatic monocarboxylic acid or a phosphoric acid of the formula

$$R_3COOR_4 \quad IV$$

$$\text{or } (HO)_2POOR_4 \quad V$$

wherein R_3 is Ar, straight chain alkyl or branched chain alkyl of 8–18 carbon atoms and R_4 is the residue of an ethoxylated alkylphenol of the formula



VI

wherein a is 0–12 and b is 1–24 or an ethoxylated alkanol residue of the formula

$$CH_3(CH_2)_c—O—(CH_2CH_2O)_d—CH_2CH_2— \quad VII$$

wherein c is 7–22, d is 1–24 and R_3 is linear or branched chain alkyl of 1–21 carbon atoms, phenyl or tolyl.

4,708,720

PROTECTION OF HYDROCARBONS AGAINST THE ACTION OF MICROORGANISMS

Henri Grangette, Lyons; Michel Llinares, Saint Genis Laval; Bernard Bossand, Communay, and Alain Faure, Saint-Chamond, all of France, assignors to Societe Anonyme Elf France, France

Filed Feb. 13, 1986, Ser. No. 829,405
Claims priority, application France, Feb. 13, 1985, 85 02035
Int. Cl.[4] C10L 1/32
U.S. Cl. 44—51 14 Claims

1. Process for the inhibition of microorganisms in a petroleum distillate which comprises introducing into said distillate, a biocidal effective amount of a microemulsion comprising petroleum distillate, 0.1–5% biocide for said microorganism, 0.2–6% water, 1–12% surfactant and 0.2–3% solvent for said surfactant, wherein the surfactant is a petroleum or alkyl benzene sulphonate, or a polyoxyalkylated alcohol or phenol, or sulfosuccinate.

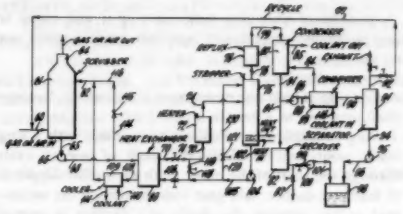
8. Composition for the inhibition of microorganisms in a petroleum distillate comprising a microemulsion of petroleum distillate, 0.1–5% biocide for said microorganism, 0.2–6% water, 1–12% surfactant and 0.2–3% of solvent for said surfactant, wherein the surfactant is a petroleum or alkyl benzene sulphonate, or a polyoxyalkylated alcohol or phenol, or sulfosuccinate.

4,708,721

SOLVENT ABSORPTION AND RECOVERY SYSTEM

Arthur J. Ehrler, Brooklyn, Ohio, assignor to General Signal Corporation, Stamford, Conn.

Continuation of Ser. No. 677,233, Dec. 3, 1984, abandoned. This application Mar. 13, 1987, Ser. No. 24,850
Int. Cl.[4] B01D 53/14
U.S. Cl. 55—40 3 Claims



1. A method of removing a gaseous or vaporized pollutant from a gaseous stream at substantially atmospheric pressure containing the same which comprises passing said stream containing said pollutant into contact with a dialkylphthalate selective solvent or absorbent for said pollutant, removing the resulting treated stream now having a reduced amount of said pollutant therein and recovering said selective solvent now having said pollutant contained therein, heating the resulting recovered said selective solvent to an elevated temperature, said elevated temperature being higher than the temperature at which said selective solvent was brought into contact with said stream, so as to release said pollutant from said selective solvent, recovering the resulting released pollutant, recovering the resulting heated liquid selective solvent now having a reduced amount of pollutant therein, cooling the resulting treated heated selective solvent and introducing the resulting cooled selective solvent into contact with an additional pollutant-containing stream for the removal of pollutant therefrom, the contacting operation between said selective solvent and said pollutant-containing gaseous stream and the release of the pollutant from the resulting heated selective solvent being carried out such that the pressure during which said selective solvent contacts said pollutant-containing stream is higher than

the pressure during which said pollutant is released from said heated selective solvent.

4,708,722

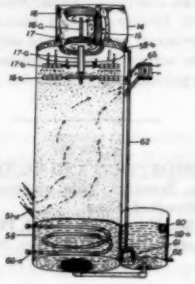
AIR WASHER AND HEAT EXCHANGER

Henry T. Childs, Chattanooga, Tenn., assignor to Temperature Adjusters, Inc., Chattanooga, Tenn.

Continuation-in-part of Ser. No. 601,655, Apr. 18, 1984, abandoned. This application Mar. 6, 1986, Ser. No. 836,696

Int. Cl.[4] B01D *53/14*

U.S. Cl. 55—89 **4 Claims**



1. A method of changing water into mist and spray and washing pollutant materials and heat from smokey gases, comprising the steps of

a. having a chamber,

b. positioning at least one motor near the chamber, having its shaft attached to a gear in a gear train,

c. having two gears, in said gear train, each with a single shaft, positioned to allow the shaft of one to extend through the shaft of the other, with each shaft supporting at least one dasher, said gear train providing the means of said motor rotating the shafts and dashers in opposite directions in a whirling motion inside the chamber,

d. locating a reservoir of water near the chamber base,

e. positioning a water pump, protected by filters, to have means of delivering a continuous volume of water from said reservoir into the paths of the whirling dashers, thus creating a mist and spray,

f. connecting a gas intake pipe to the chamber, thus providing means for the polluted gases to pass into the chamber, and its mist and spray of water, and having means of delivering said pollutant materials and heat, washed by the mist and spray from the smokey gases, into the reservoir of water below,

g. connecting a discharge pipe to the chamber, providing means for the gases to pass out of the chamber,

h. installing water heat pipe coils through the reservoir of water, having means of delivering heat elsewhere,

i. having means of supplying an outside source of water to the reservoir,

j. locating a water level valve positioned to maintain a constant volume of water in the reservoir,

k. having a drain connected to the reservoir, supplying means for changing reservoir water,

l. locating an induced draft fan positioned in or near the discharge pipe for needed draft through the chamber.

4,708,723

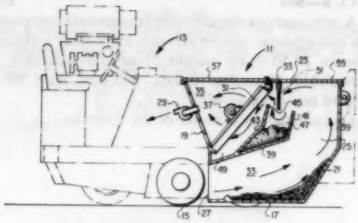
ROTARY BROOM SWEEPER HOPPER

D. Franklin Howeth, P.O. Box 6517, Fort Worth, Tex. 76115

Filed Jun. 30, 1986, Ser. No. 879,994

Int. Cl.[4] B01D *50/00*

U.S. Cl. 55—321 **11 Claims**



1. A dust and debris hopper for a rotary broom sweeper, which comprises:

a housing including a rear wall, a bottom wall, and a top wall, said housing including a dust and debris inlet positioned between said bottom wall and said rear wall;

a filter element positioned in said housing adjacent said rear wall and said top wall;

a first interior wall extending from said rear wall between said inlet and said filter element, at least a portion of said interior wall projecting toward said top wall, said interior wall defining a tortuous flow path of air between said inlet and said filter element;

a second interior wall positioned between said filter element and said first interior wall, at least a portion of said second interior wall projecting toward said top wall, said second interior wall and said first interior wall forming a secondary material receiving chamber therebetween, said secondary material receiving chamber being positioned upstream from said filter element;

and an impingement panel positioned generally perpendicular to said top wall and extending into said secondary material receiving chamber, whereby the air flow between said inlet and said filter element reverses direction about said panel in said secondary material receiving chamber.

4,708,724

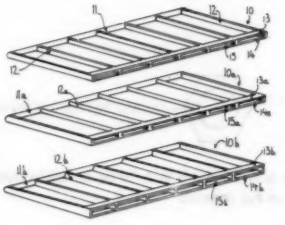
HIGH EFFICIENCY PARTICULATE AIR FILTER AND SEPARATORS, THEREFOR

Boyd F. Agnew, Rancho Mirage, Calif., assignor to Gertrude B. F. Agnew, Rancho Mirage, Calif.

Filed May 12, 1986, Ser. No. 862,493

Int. Cl.[4] B01D *46/04*

U.S. Cl. 55—500 **6 Claims**



1. A separator for pleated air filters which comprises a lattice having a pair of spaced parallel longitudinal members one of

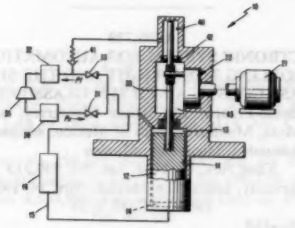
which has a rounded outer surface adapted to engage the inner surface of a pleat fold and the other of which is composed of a pair of superimposed vertically spaced apart flat strips, adapted to support the ends of a pair of superimposed pleats, and a plurality of laterally spaced apart transverse strut members joining said longitudinal members said strut members having flat or rounded upper and lower surfaces thereon for engagement with the pleat surfaces, said separator comprising a plurality of sections joined side by side at the ends of said longitudinal members by interlocking engagement.

4,708,725

CRYOGENIC REFRIGERATOR

Nobuo Okumura, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Nov. 17, 1986, Ser. No. 931,038
Claims priority, application Japan, Nov. 16, 1985, 60-257294
Int. Cl.[4] F25B *9/00*
U.S. Cl. 62—6 **9 Claims**



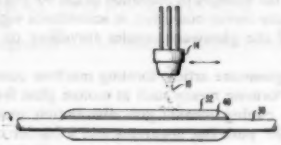
1. A cryogenic refrigerator comprising,
a cylinder;
a displacer movable within said cylinder;
an upper chamber formed at an upper end portion of said cylinder above said displacer;
a lower chamber formed at a lower end portion of said cylinder below said displacer;
the volumes of said upper and lower chambers being defined by the movement of said displacer;
a conduit connecting said upper chamber and said lower chamber;
a regenerator arranged in said conduit;
a rod, a lower end portion of the rod being connected to an upper end portion of said displacer;
a motor operatively connected to said rod through crank means for moving said displacer in a cycle consisting of a first step at which said displacer is in an uppermost position in the cylinder, a second step at which said displacer is in downward movement, a third step at which said displacer is in a lowermost position in the cylinder, and a fourth step at which said displacer is in upward movement;
a supply reservoir for supplying high-pressure fluid;
an exhaust reservoir for receiving low-pressure fluid;
valve means associated with said supply and exhaust reservoirs and controlled for delivering high-pressure fluid into said upper chamber and said conduit while said displacer is at the first and second steps of and for exhausting low-pressure fluid while said displacer is at the third and fourth steps;
a bore movably receiving an upper end portion of said rod, said bore being fluidly separated from said upper chamber; and,
a one-way valve for supplying low-pressure fluid continually to said bore.

4,708,726

FABRICATION OF A LIGHTGUIDE PREFORM BY THE OUTSIDE VAPOR DEPOSITION PROCESS

Thomas J. Miller, Hillsborough Township, Somerset County, and David A. Nicol, Hamilton Township, Mercer County, both of N.J., assignors to AT&T Technologies, Inc., Berkeley Heights, N.J.

Continuation-in-part of Ser. No. 802,420, Nov. 27, 1985, abandoned. This application Sep. 2, 1986, Ser. No. 902,126
Int. Cl.[4] C03B *37/023*
U.S. Cl. 65—3.12 **8 Claims**



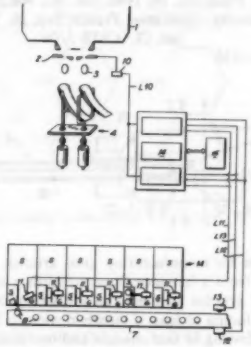
1. A method of fabricating a lightguide preform, comprising the steps of:
depositing at least one layer of carbon on a glass mandrel;
depositing at least one layer of glass soot on the carbon coated glass mandrel;
heating the soot and carbon coated mandrel at a temperature below the glass soot reflow temperature to oxidize the carbon to CO_2 which is exhausted through the interstices of the porous soot; and
consolidating the soot layers on the mandrel, at an elevated temperature, to form the preform.

4,708,727

METHOD AND APPARATUS FOR SYNCHRONIZING THE VELOCITY OF A 90 DEGREE PUSH-OUT APPARATUS AND OF THE CARRIER CONVERYOR IN AN I.S. GLASSWARE FORMING MACHINE

Luis Cardenas-Franco, and Fernando Taddei-Contreras, both of Monterrey, Mexico, assignors to Vitro Tec Fideicomiso, Monterrey, Mexico

Filed Nov. 14, 1986, Ser. No. 931,213
Int. Cl.[4] C03B *9/40*
U.S. Cl. 65—29 **3 Claims**



1. In a glassware article forming machine comprising handling and forming means such as molten glass feeding means, glass gob cutting means, glass gob distribution means, forming means, a 90° push out apparatus and a carrier conveyor; a method for synchronizing the velocity of the 90° push-out apparatus and of the carrier conveyor, comprising: sensing the

velocity of operation of the glass gob cutting means, of the 90° push out apparatus and of the carrier conveyor, as well as the number of articles per time unit travelling on said carrier conveyor, by means of sensor means associated with said components; deriving signals representative of the detected parameters, from said sensor means; feeding said signals to a data processor; feeding optimum predetermined operation parameters for said components as well as a desired separation data for the articles, to said data processor, through data feeding means associated therewith; relating said derived signals with the fed operation parameters in said data processor; and generating synchronized control signals from said data processor, in order to control the velocity of operation of the 90° push out apparatus and of the carrier conveyor, in accordance with the desired spacing of the glassware articles travelling on said carrier conveyor.

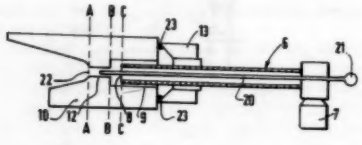
2. In a glassware article forming machine comprising handling and forming means such as molten glass feeding means, glass gob cutting means, gob distribution means, forming means, a 90° push out apparatus and a carrier conveyor; an apparatus for synchronizing the velocity of the 90° push-out apparatus and of the carrier conveyor, comprising: first, second and third velocity sensor means associated the glass gob cutting means, with the 90° push out apparatus, and with the carrier conveyor, respectively, to provide signals representative of the velocity thereof; counting means associated with said carrier conveyor, to provide a signal representative of the number of articles per time unit, travelling on said carrier conveyor; and a data processor which receives said signals, and comprising a memory containing optimum predetermined data of operation for said glass gob cutting means, 90° push out apparatus and carrier conveyor, including the data of the desired spacing between the glassware articles on said carrier conveyor and an algorithm to relate the received signals with the predetermined data, in order to derive control signals to synchronizing the velocity of the 90° push out apparatus with the velocity of the carrier conveyor in accordance with the desired spacing for the glassware articles.

4,708,728

DEVICE TO IMPROVE THE HEATING OF A GLASS DISTRIBUTION CHANNEL AND PROCESS FOR OPERATING SUCH DEVICE

Marc Desprez, Ville d'Avray, and Michel Roux, Marnes-la-Coquette, both of France, assignors to L'Air Liquide, Paris, France

Filed Sep. 16, 1986, Ser. No. 908,351
Claims priority, application France, Sep. 20, 1985, 85 13949
Int. Cl.[4] C03B *5/04*
U.S. Cl. 65—136 **8 Claims**



1. Process for manufacturing glass articles, in which glass originating from a furnance flows towards a location for producing said articles by means of a distribution channel, said channel including at least a burner device to heat the molten glass vein flowing in said channel and maintain same at a temperature T_1, the process comprising feeding a combined air and gaseous fuel mixture into the burner device, and feeding supplemental oxygen from oxygen feeding means into a feed tube mounted within said burner device, the oxygen flowing from the oxygen feeding means being such that the concentration in volume of oxygen in the combustive mixture after mixing the oxygen and the premixture under normal conditions of temperature and pressure remains substantially lower than or equal to 30%.

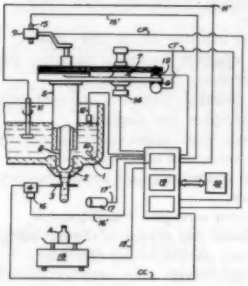
4. An improved burner device for heating a channel for distribution of glass, said device comprising a refractory block mounted in said glass distribution channel, said refractory block having an outside wall, an inside face and a cylindrical bore, said bore having a first and a second diameter, said first diameter being larger than said second diameter and beginning on said outside wall of said block and further extending partways through said block, said second diameter extending from the inner end of said first diameter to said inside face; a cylindrical duct having a portion mounted inside said first diameter of said bore in said block, said duct extending from beyond said block to within the first diameter of said bore in said block; an annular sealing ring with an inner and outer diameter, said inner diameter of said ring having the same diameter as said cylindrical duct, said ring being mounted around said duct for attaching and sealing said duct to said block; a feed tube mounted inside said duct, the feed tube extending into the second diameter of said cylindrical bore in said block; oxygen feeding means for feeding oxygen to said feed tube; and air/fuel gas feeding means attached to said cylindrical duct for feeding air/fuel gas mixture to said duct.

4,708,729

ELECTRONIC SYSTEM FOR AUTOMATICALLY CONTROLLING THE WEIGHT AND THE SHAPE OF GLASS GOBS IN A MOLTEN GLASS FEEDER

Luis Cardenas-Franco, Las Brisas Monterrey, and Ricardo Lopez-Mota, Monterrey, both of Mexico, assignors to Vitro Tec Fideicomiso, Monterrey, Mexico

Filed Nov. 12, 1986, Ser. No. 930,313
Claims priority, application Mexico, Nov. 14, 1985, 604
Int. Cl.[4] C03B *9/28*
U.S. Cl. 65—164 **6 Claims**



1. An electronic system to automatically control the weight and shape of glass gobs in a molten glass feeder, of the type that includes a glass feeder bowl which has at least one feeding orifice; a rotating tube at the feeder bowl, aligned with the orifice, and mounted in a mechanism that controls its rotation and height with respect to the orifice in order to homogenize the glass in the feeder bowl and regulate the passage of the glass towards the orifice; at least a reciprocating plunger in the tube and aligned with the orifice, mounted on a reciprocating mechanism which provides and controls its reciprocating movement in order to push out a predetermined amount of glass towards the orifice; and at least one pair of reciprocating shear blades placed opposite to each other, underneath the orifice, and mounted on a reciprocating mechanism in order to cut glass gobs from the flow that comes out of the orifice and wherein the system comprise: a weight detector that provides a representative signal of the weight of the finished article; viscosity, temperature and glass level detectors at the feeder bowl which provide representative signals of the viscosity,

temperature and glass level, respectively; glass gob cutting and glass gob image detectors next to the shear blades that provide representative signals at the moment of cutting and an image of the cut gobs; position detectors of the tube and the plunger that provide representative signals of the rotation speed and height of the tube with respect to the orifice and of the speed and reciprocating stroke of the plunger; a data processing unit which receives and processes the signals from the detectors in order to compare the weight of the finished articles with the predetermined weight of the same and relates the weight and glass gob shape deviations with the viscosity, temperature and level of the glass in the feeder bowl and with the cutting speed, speed and height of the tube, speed and stroke of the plunger and shape of the gobs in order to provide compensation signals to the mechanisms of the tube, plunger and shear blades so as to obtain the shape of the gob and the predetermined weight of the articles.

4,708,730

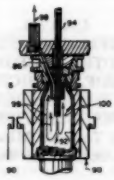
APPARATUS FOR BLOW MOLDING GLASS ARTICLES

Michael J. Ziegler, Parma Heights, and F. Richard Simpkins, Newbury, both of Ohio, assignors to AGA AB, Cleveland, Ohio

Division of Ser. No. 798,614, Nov. 15, 1985, Pat. No. 4,652,292, which is a continuation-in-part of Ser. No. 600,410, Apr. 16, 1984, Pat. No. 4,553,999. This application Dec. 22, 1986, Ser. No. 945,285

Int. Cl.[4] C03B *9/36*

U.S. Cl. 65—261 **6 Claims**



1. In a hollow glass article manufacturing machine including a mold having a cavity into which a quantity of molten glass is introduced to be conformed to a desired shape as defined by the mold cavity, and having gas inlet means for admitting a flow of blowing gas to the mold cavity interiorally with respect to the hollow glass article being formed in the cavity to directly cool interior surface portions of the molten glass therein for at least assisting in conforming a quantity of molten glass to a desired configuration defined by the mold cavity, the improvement of means for providing a flow of a mixture of pressurized cold cryogen vapor and ambient air for use as a pressurized blowing gas that has a temperature substantially below that of ambient air, and means for supplying the flow of pressurized blowing gas to the gas inlet means, wherein the supply means includes:

(a) insulated manifold means for containing a supply of said mixture of ambient air and cold cryogen vapor;

(b) blower means for pressurizing ambient air;

(c) conduit means for ducting pressurized ambient air from the blower means to the insulated manifold means; and,

(d) cryogen injector means including a plurality of cryogen injectors for introducing cold cryogen vapor into the conduit means at spaced locations.

4,708,731

NOVEL 5-HALOGENOALKYL-1,3,4-THIADIAZOL-2-YLOXYACETAMIDE HERBICIDES AND FUNGICIDES

Heinz Förster; Hans-Joachim Diehr; Fritz Maurer, all of Wuppertal; Erich Klauke, Odenthal; Ludwig Eue, Leverkusen; Hans-Joachim Santel, Cologne; Robert R. Schmidt, Bergisch-Gladbach; Paul Reinecke, and Gerd Hänssler, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

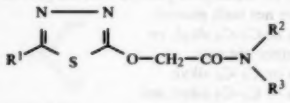
Filed Dec. 21, 1984, Ser. No. 684,567

Claims priority, application Fed. Rep. of Germany, Jan. 4, 1984, 3400168

Int. Cl.[4] C07D *285/12;* **A01N** *43/82*

U.S. Cl. 71—90 **10 Claims**

1. A 5-halogenoalkyl-1,3,4-thiadiazol-2-yloxyacetamide of the formula

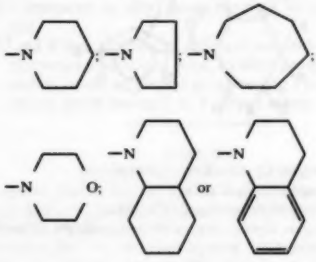


in which

R^1 is $F_3C—CF_2—CF_2—$, $Cl_2CH—$, $ClFF_2C—$, $Cl_2FC—$ or $Cl_3C—$, and

R^2 and R^3 each independently is hydrogen, alkyl with 1 to 6 carbon atoms, alkenyl or alkinyl with in each case 2 to 6 carbon atoms, cycloalkyl or cycloalkenyl which has 5 to 7 carbon atoms and is optionally mono-, di- or tri-substituted by methyl or ethyl, or is alkoxy, alkoxyalkylenoxy or alkoxyalkyl with in each case 1 to 6 carbon atoms in the individual alkyl parts, halogenoalkyl with 1 to 6 carbon atoms and 1 to 5 halogen atoms, benzyl, and/or phenyl which is itself optionally mono-, di- or tri-substituted by methyl, ethyl, methoxy, methylthio, trifluoromethyl, trifluoromethoxy, trifluoromethylthio, fluorine, chlorine and/or nitro, or

R^2 and R^3, together with the nitrogen atom to which they are bonded, form



which is optionally substituted by methyl, ethyl and/or phenyl.

4,708,732

2-(PYRIMIDINECARBONYL)-1,3-CYCLOHEXANEDIONES AND THEIR USE AS HERBICIDAL AGENTS

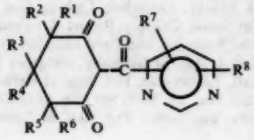
Charles G. Carter, Columbia, Md., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Oct. 24, 1986, Ser. No. 922,620

Int. Cl.[4] A01N *43/50;* **C07D** *239/28, 239/30, 239/24*

U.S. Cl. 71—92 **27 Claims**

1. Compounds of the formula



wherein

R^1 is hydrogen, C_1–C_4 alkyl or phenyl;

R^2 is hydrogen or C_1–C_4 alkyl; or

R^1 and R^2 together are C_2–C_5 alkylene;

R^3 is hydrogen, C_1–C_4 alkyl or phenyl, with the proviso that R^1 and R^3 are not both phenyl;

R^4 is hydrogen or C_1–C_4 alkyl; or

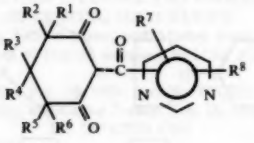
R^3 and R^4 together are oxo;

R^5 is hydrogen or C_1–C_4 alkyl;

R^6 is hydrogen or C_1–C_4 alkyl; and

R^7 and R^8 independently are (1) hydrogen; (2) halogen; (3) C_1–C_4 alkyl; (4) C_1–C_4 alkoxy; (5) trifluoromethoxy; (6) cyano; (7) nitro; (8) C_1–C_4 haloalkyl; (9) R^bSO_n— wherein n is the integer 0, 1 or 2; and R^b is (a) C_1–C_4 alkyl; (b) C_1–C_4 alkyl substituted with halogen or cyano; (c) phenyl; or (d) benzyl; (10) —NR^cR^d wherein R^c and R^d independently are hydrogen or C_1–C_4 alkyl; (11) R^eC-(O)— wherein R^e is C_1–C_4 alkyl or C_1–C_4 alkoxy; or (12) —$SO_2NR^cR^d$ wherein R^c and R^d are as defined; and (13) —$N(R^c)C(O)R^d$ wherein R^c and R^d are as defined; and their herbicidally acceptable salts.

9. A method of controlling undesirable vegetation consisting of applying to the area where control is desired, a herbicidally effective amount of a compound having the formula



wherein

R^1 is hydrogen, C_1–C_4 alkyl or phenyl;

R^2 is hydrogen or C_1–C_4 alkyl; or

R^1 and R^2 together are C_2–C_5 alkylene;

R^3 is hydrogen, C_1–C_4 alkyl or phenyl, with the proviso that R^1 and R^3 are not both phenyl;

R^4 is hydrogen or C_1–C_4 alkyl; or

R^3 and R^4 together are oxo;

R^5 is hydrogen or C_1–C_4 alkyl;

R^6 is hydrogen or C_1–C_4 alkyl; and

R^7 and R^8 independently are (1) hydrogen; (2) halogen; (3) C_1–C_4 alkyl; (4) C_1–C_4 alkoxy; (5) trifluoromethoxy; (6) cyano; (7) nitro; (8) C_1–C_4 haloalkyl; (9) R^bSO_n— wherein n is the integer 0, 1 or 2; and R^b is (a) C_1–C_4 alkyl; (b) C_1–C_4 alkyl substituted with halogen or cyano; (c) phenyl; or (d) benzyl; (10) —NR^cR^d wherein R^c and R^d independently are hydrogen or C_1–C_4 alkyl; (11) R^eC-(O)— wherein R^e is C_1–C_4 alkyl or C_1–C_4 alkoxy; or (12) —$SO_2NR^cR^d$ wherein R^c and R^d are as defined; and (13) —$N(R^c)C(O)R^d$ wherein R^c and R^d are as defined; and their herbicidally acceptable salts.

4,708,733

HERBICIDAL 4-CHLORO-ARYLOXY-ACETYL- AND 4-CHLORO-ARYLOXY-PROPIONYL-MALONATES

Tamás Komives, Budapest; Ferenc Dutka, Budapest; István Barta, Paty; István Jablonkai, Budapest; Ágnes Hulesch, Budapest; Ferenc Bihari, Budapest; Gyula Eifert, Dunaharaszti; Péter Bohus, Budapest; Mihály Nagy, Budapest; György Bácskai, Budapest, and Istvan Kuronya, Budapest, all of Hungary, assignors to Budapesti Vegyimuvek and MTA Kozponti Kemiai I Kutato Intezet, both of Budapest, Hungary

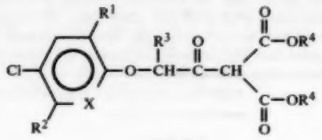
Filed Sep. 23, 1986, Ser. No. 910,736

Claims priority, application Hungary, Oct. 1, 1985, 3799/85; Jun. 27, 1986, 3799/85

Int. Cl.[4] **A01N** *43/40, 31/14;* **C07D** *213/64;* **C07C** *69/612*

U.S. Cl. 71—94 **5 Claims**

1. A compound of the Formula (I)



(I)

wherein

R^1 is chloro or methyl;

R^2 is hydrogen or chloro;

R^3 is hydrogen or methyl

R^4 is C_1 to C_4 alkyl and the two R^4 groups may be identical or different; and

X is —N= or —CH=.

4. A herbicidal composition which comprises as active ingredient a herbicidally effective amount of the compound of the Formula (I) defined in claim **1** in admixture with an agriculturally inert carrier.

4,708,734

5-(2-CHLORO-4-TRIFLUOROMETHYLPHENOXY)-2-NITRO-α-SUBSTITUTED-ACETOPHENONE, OXIME DERIVATIVE THEREOF, HERBICIDAL COMPOSITION, AND METHOD FOR THE DESTRUCTION OF UNDESIRABLE WEEDS

Yoshiharu Hayashi, and Teruyuki Misumi, both of Yokohama, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

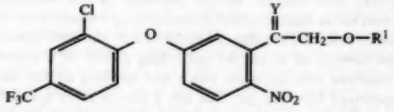
Filed Dec. 11, 1985, Ser. No. 807,799

Claims priority, application Japan, Dec. 12, 1984, 59-262165; Feb. 21, 1985, 60-31604; May 9, 1985, 60-96611; Jun. 10, 1985, 60-124365; Jul. 15, 1985, 60-154285

Int. Cl.[4] **A01N** *37/00;* **C07C** *79/46, 101/00, 81/08*

U.S. Cl. 71—100 **45 Claims**

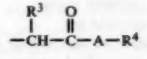
1. A compound represented by the formula



(I)

wherein

R^1 represents a methyl group or



in which

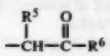
A represents an oxygen atom or a sulfur atom,

R^3 represents a hydrogen atom or a methyl group, and

R^4 represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an alkenyl group having 3 to 6 carbon atoms, an alkynyl group having 3 to 6 carbon atoms, or an alkyl group having 1 to 4 carbon atoms and substituted with a halogen atom, an alkoxy group having 1 to 3 carbon atoms or a carboalkoxy group having 2 to 4 carbon atoms; and

Y represents an oxygen atom or $=N\text{-}O\text{-}R^2$ in which

R^2 represents a hydrogen atom, an alkyl group having 1 to 3 carbon atoms or



in which

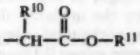
R^5 represents a hydrogen atom or a methyl group, and

R^6 represents $-BR^7$ or

in which

B represents an oxygen atom or a sulfur atom,

R^7 represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an alkenyl group having 3 to 6 carbon atoms, an alkynyl group having 3 to 6 carbon atoms, an unsubstituted phenyl group, a phenyl group substituted with a chlorine atom, a methyl group or a methoxy group, an alkyl group having 1 to 4 carbon atoms and substituted with a halogen atom or an alkoxy group having 1 to 3 carbon atoms, an alkali metal, an alkaline earth metal, an ammonium group, an ammonium group substituted with an alkyl group having 1 to 4 carbon atoms, or



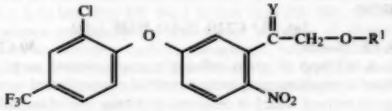
in which

R^{10} represents a hydrogen atom or a methyl group, and

R^{11} represents an alkyl group having 1 to 3 carbon atoms, and

R^8 and R^9 are identical or different and each independently represents a hydrogen atom, an alkyl group having 1 to 3 carbon atoms, an alkynyl group having 3 to 6 atoms, or an alkoxy gorup having 1 to 3 carbon atoms.

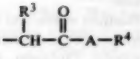
32. A method for the destruction of undesirable weeds, which comprises applying to said weeds a herbicidally effective amount of a compound represented by the formula



(I)

wherein

R^1 represents a methyl group or



in which

A represents an oxygen atom or a sulfur atom,

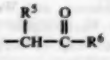
R^3 represents a hydrogen atom or a methyl group, and

R^4 represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an alkenyl group having 3 to 6 carbon atoms, an alkynyl group having 3 to 6 carbon atoms, or an alkyl group having 1 to 4 carbon atoms and substituted with a halogen atom, an alkoxy group having 1 to 3 carbon atoms or a carboalkoxy group having 2 to 4 carbon atoms; and

Y represents an oxygen atom or $=N\text{-}O\text{-}R^2$

in which

R^2 represents a hydrogen atom, an alkyl group having 1 to 3 carbon atoms or



in which

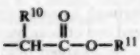
R^5 represents a hydrogen atom or a methyl group, and

R^6 represents $-BR^7$ or

in which

B represents an oxygen atom or a sulfur atom,

R^7 represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an alkenyl group having 3 to 6 carbon atoms, an alkynyl group having 3 to 6 carbon atoms, an unsubstituted phenyl group, a phenyl group substituted with a chlorine atom, a methyl group or a methoxy group, an alkyl group having 1 to 4 carbon atoms and substituted with a halogen atom or an alkoxy group having 1 to 3 carbon atoms, an alkali metal, an alkaline earth metal, an ammonium group, an ammonium group substituted with an alkyl group having 1 to 4 carbon atoms, or



in which

R^{10} represents a hydrogen atom or a methyl group, and

R^{11} represents an alkyl group having 1 to 3 carbon atoms, and

R^8 and R^9 are identical or different and each independently represents a hydrogen atom, an alkyl group having 1 to 3 carbon atoms, an alkynyl group having 3 to 6 atoms, or an alkoxy group having 1 to 3 carbon atoms.

4,708,735

HERBICIDE COMPOSITIONS

Ferenc M. Pallos, Walnut Creek; Mervin E. Brokke, Moraga, and Duane R. Arneklev, Sunnyvale, all of Calif., assignors to Stauffer Chemical Co., Westport, Conn.

Division of Ser. No. 480,185, Mar. 28, 1983, which is a division of Ser. No. 369,322, Apr. 16, 1982, Pat. No. 4,415,352, which is a division of Ser. No. 196,518, Oct. 14, 1980, abandoned, which is a division of Ser. No. 930,967, Aug. 4, 1978, Pat. No. 4,269,618, which is a division of Ser. No. 208,041, Dec. 9, 1971, Pat. No. 4,137,070. This application Aug. 13, 1984, Ser. No. 640,287

The portion of the term of this patent subsequent to Nov. 7, 1995, has been disclaimed.

Int. Cl.[4] A01N *37/22*

U.S. Cl. 71—118 **3 Claims**

1. A herbicide composition comprising a halocentanilide herbicide and a non-phytotoxic, antidotally effective amount of an amide of dichloroacetic acid, said amide of dichloroacetic acid having about 14 or fewer carbon atoms and said amide of dichloroacetic acid being antidotally active with said haloacetanilide herbicide, provided that said amide of dichlo-

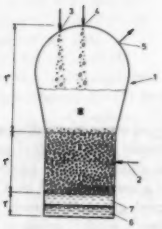
roacetic acid is other than an N,N-dihydro or an N-hydro, N-halophenyl amide of dichloroacetic acid.

4,708,736

METHOD OF PRODUCING MOLTEN PIG IRON OR STEEL PRE-PRODUCTS FROM PARTICULATE FERROUS MATERIAL

Rolf Hauk, Düsseldorf, Fed. Rep. of Germany, and Werner Kepplinger, Linz, Austria, assignors to Voest-Alpine Akt., Austria and Korf Engineering GmbH, Fed. Rep. of Germany

Filed Mar. 12, 1986, Ser. No. 838,669
Claims priority, application Austria, Mar. 21, 1985, 846/85
Int. Cl.[4] C21B *11/00*
U.S. Cl. 75—26 2 Claims



1. In a method of producing molten pig iron or steel pre-products from pre-reduced iron-sponge, as well as of producing reduction gas in a melt-down gasifier having a wall by adding coal and by blowing in oxygen-containing gas by means of nozzle pipes penetrating said wall of said melt-down gasifier, a fixed bed of coke particles flowed through by said oxygen-containing gas and a superposed fluidized bed of coke particles being formed, said ferrous material being charged onto said fluidized bed, the improvement comprising providing a further fixed bed of coke particles below said fixed bed, said further fixed bed being not flowed through by gas, said fluidized bed being located above said fixed bed and being flowed through by one of an oxygen-free and an oxygen-poor gas, said gasifier having sufficient volume above said fixed bed to confine said fluidized bed.

4,708,737

INJECTABLE REAGENTS FOR MOLTEN METALS

Edward J. Skach, Jr., Freeport; David W. Brake, West Columbia, and Joseph H. Waibel, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 25, 1986, Ser. No. 899,859
Int. Cl.[4] C21C *7/02*
U.S. Cl. 75—58 13 Claims

1. A method of preparing an injectable reagent for processing molten metal, said method comprising

impregnating a metal, in molten form, into non-molten non-metallic inorganic particles in an atmosphere substantially devoid of extraneous reactants, the weight of said molten metal being less than the weight of the said non-molten, non-metallic inorganic particles,

cooling the so-impreregnated particles to freeze the metal reagent, and

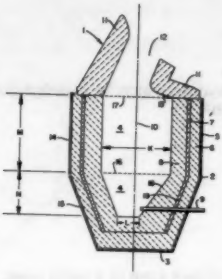
effecting a recovery of inorganic reagent having metal reagent impregnated therein, said metal reagent comprising less than 50% by weight of the so-formed particles.

4,708,738

METHOD FOR REFINING VERY SMALL HEATS OF MOLTEN METAL

Ian F. Masterson, Danbury, Conn.; Jonathan J. Feinstein, North Salem, and Lanier Stambaugh, Briarcliff Manor, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Division of Ser. No. 846,800, Apr. 1, 1986, Pat. No. 4,647,019.
This application Nov. 18, 1986, Ser. No. 932,000
Int. Cl.[4] C21C *7/00*
U.S. Cl. 75—59.1 7 Claims



1. A method for refining a molten metal melt weighing about two tons or less comprising: (1) providing a melt weighting about two tons or less to a refining vessel having no external heater, at least one tuyere, and a sidewall and a bottomwall cooperating to define a volume of from 1.8 to 3.9 times the volume of the melt, said sidewall comprising a straight section, perpendicular to and spaced from the bottomwall, and an inwardly sloped section, between and in contact with the straight section and bottomwall, the height of the straight section being at least 1.6 times the height of the inwardly sloped section, the volume defined by the inwardly sloped section being not more than 30 percent of the total volume of the vessel and having a minimum diameter at least 0.3 times the height of the inwardly sloped section; (2) injecting refining gas(es) into the melt through said tuyere(s); (3) maintaining the melt surface at least 10 inches above at least one gas injection point; and (4) maintaining a freeboard of at least 22 inches.

4,708,739

GRAIN REFINING METALS

James L. F. Kellie, and Andrew J. J. Cowell, both of Sheffield, England, assignors to London & Scandinavian Metallurgical Co. Limited, London, England

Filed Sep. 29, 1986, Ser. No. 912,227
Claims priority, application United Kingdom, Oct. 4, 1985, 8524531
Int. Cl.[4] C22B *15/00;* B22F *1/00*
U.S. Cl. 75—76 30 Claims

1. A method of grain refining a copper-based metal, the method comprising preparing a melt of copper-based metal to be grain refined which is deficient in at least one of the following components (a) to (d), said components (a) to (d) comprising:

(a) at least one of titanium and zirconium;

(b) at least one of: lithium, sodium, potassium, beryllium, magnesium, calcium, strontium and barium;

(c) at least one of: scandium, yttrium, titanium when said component (a) is zirconium, zirconium when said component (a) is titanium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum, tungsten, manganese, technetium, rhenium, iron, ruthenium, osmium, cobalt, rhodium, iridium, nickel, palladium, platinum, silver, gold, zinc, cadmium, mercury and the rare earth elements; and

(d) at least one of: aluminium, gallium, indium, silicon, germa-

nium, tin, lead, phosphorus, arsenic, antimony, bismuth, sulphur, selenium and tellurium;

introducing said deficient component (a) to (d) into said melt of copper-based metal by means of a powder which contains at least one of said components (a) to (d) including said deficient component, and thereafter solidifying said melt of copper-based metal which now contains each of said components (a) to (d) to produce grain refined copper-based metal.

4,708,740

TECHNIQUE FOR FORMING SILICON CARBIDE COATED POROUS FILTERS

Paul D. Tungatt, Middletown; Derek E. Tyler, Cheshire, and Harvey P. Cheskis, North Haven, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 599,098, Apr. 11, 1984, Pat. No. 4,537,627. This application Jan. 14, 1985, Ser. No. 691,618

Int. Cl.⁴ C22B *15/00*

U.S. Cl. 75—76 **13 Claims**

1. A process for forming a filter to be used in removing unwanted impurities and contaminants from molten metal, said process comprising:

preparing a slurry containing silicon carbide particles and having a viscosity in the range of from about 1 centipoise to about 50 centipoise;

said preparing step comprising mixing together an inactive carrying medium, a binding agent and a wetting agent;

said preparing step further comprising adding powdered silicon carbide having a maximum settling rate of about 0.1 mm/min. to said mixture to form said slurry;

providing a porous substrate material having an open cell structure characterized by a plurality of interconnected voids; and

forming a thin substantially uniform silicon carbide coating on said substrate material, said coating forming step comprising impregnating said substrate material with said slurry.

4,708,741

RAPID SINTERING FEEDSTOCK FOR INJECTION MOLDING OF STAINLESS STEEL PARTS

German Amaya, Longwood, Fla., assignor to Brunswick Corporation, Skokie, Ill.

Filed Jun. 13, 1986, Ser. No. 873,957

Int. Cl.⁴ B22F *3/00*

U.S. Cl. 75—251 **4 Claims**

1. A feedstock for the injection molding of type 300 stainless steel parts, consisting essentially of 75–95 weight percent finely divided metal powders; the balance, sacrificial binder materials,

characterized by metal powders substantially all of which are finer than 40 microns and having a mean particle size finer than 15 microns, the cumulative concentrations of said powders consisting essentially of 18 to less than 20% Cr, 6 to less than 8% Ni, 1 to less than 2% Mo, with the balance essentially Fe and minor amounts of elements such as nitrogen, carbon, manganese, sulphur, phosphorus, and silicon, normally present in such type 300 steels, and wherein the ratio of chromium equivalents to nickel equivalents is within the range 1.4–1.65.

4,708,742

PRODUCTION OF NITRIDE DISPERSION STRENGTHENED ALLOYS

Eric G. Wilson, Woodplumpton, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Oct. 27, 1986, Ser. No. 923,637

Claims priority, application United Kingdom, Nov. 28, 1985, 8529316; Jan. 15, 1986, 8600895

Int. Cl.⁴ B22F *1/00*

U.S. Cl. 75—252 **10 Claims**

1. A method for producing a nitride dispersion strengthened alloy comprising mechanically alloying a blend of metal powders including a nitride former and a nitrogen donor and heating the mechanically alloyed powder to effect dissociation of the nitrogen donor within the individual powder particles, whereby the nitrogen made available combines with the nitride former.

4,708,743

STABLE AQUEOUS IMPREGNATING SOLUTIONS PREPARED FROM HYDROLYZED ALKYL TRIALKOXYSILANES

Werner Schmidt, St. Augustin, Fed. Rep. of Germany, assignor to Dynamit Nobel AG, Cologne, Fed. Rep. of Germany

Continuation of Ser. No. 645,252, Dec. 3, 1984, abandoned, which is a division of Ser. No. 375,941, May 7, 1982, Pat. No. 4,517,375, which is a division of Ser. No. 304,480, Sep. 22, 1981, Pat. No. 4,352,894. This application Mar. 26, 1986, Ser. No. 846,496

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1980, 3037220

Int. Cl.⁴ C09K *3/18*

U.S. Cl. 106—12 **6 Claims**

6. A method comprising: impregnating an inorganic-oxidic construction material with a stable aqueous solution of hydrolyzed alkyltrialkoxysilane to render the material water repellent, said silane being of the formula $CH_3(CH_2)_p—Si(OH)_n(OR')_{3-n}$ wherein p is 0 to 3 inclusive, R′ is an alkyl radical having from 1 to 4 carbon atoms and n can assume values between 1 and 3, said solution being produced by hydrolysis of 0.5 through 60% aqueous solutions of the alkyltrialkoxysilane at temperatures up to 40° C. said solution having a pH of from 1 to 5.

4,708,744

PROCESS FOR PHOSPHATING METAL SURFACES AND ESPECIALLY IRON SURFACES

Ramon B. Cabado, Barcelona, Spain, assignor to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Feb. 24, 1986, Ser. No. 832,923

Claims priority, application Spain, Feb. 22, 1985, 541.129

Int. Cl.⁴ C04B *9/02*

U.S. Cl. 106—14.12 **34 Claims**

1. A composition for phosphate coating a metallic substrate consisting essentially of an aqueous solution of:

(a) zinc ions present in about 1.2–2.2 g/l;

(b) phosphate ions present in about 13–30 g/l;

(c) a bromate compound present in about 0.5–1.2 g/l;

(d) a nitroaromatic compound present in about 0.2–0.5 g/l;

(e) manganese ions optionally present in 0 to about 2 g/l;

(f) nickel ions optionally present in 0 to about 1.5 g/l;

(g) cobalt ions optionally present in 0 to about 1.5 g/l; and

(h) water q.s. to 1 liter units;

wherein said solution has a total acid value of about 18–25 points and a free acid value of about 0.5–1 points.

4,708,745

PROCESS FOR THE PREPARATION AND APPLICATION IN SITU OF BLENDS OF STRUCTURAL MATERIAL

Horst Schönhausen, Im Staubenweidli 9, CH 8820 Wädenswil, Switzerland

Division of Ser. No. 593,367, Mar. 26, 1984, Pat. No. 4,585,353. This application Jan. 21, 1986, Ser. No. 820,091

Claims priority, application Switzerland, Mar. 26, 1983, 1635/83

Int. Cl.⁴ C04B *7/00*

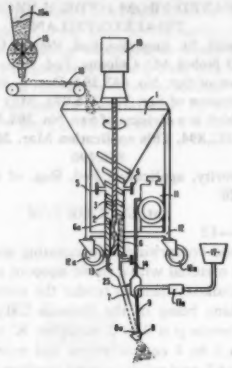
U.S. Cl. 106—85 **11 Claims**

1. A process for the preparation and application in situ of a ready-to-use blend of structural material, the components of which blend comprise water and as essential ingredients at

least one binder, at least one filler and at least one additive, said process comprising the steps of:

(a) preparing a dry blend of at least one binder and at least one filler as a premixed blend;

(b) adding to said premixed blend and thoroughly mixing therewith an aqueous solution of at least one additive and such amount of additional water required to impart to resulting mixtures a given viscosity;



(c) extruding said resulting mixtures in the form of a core;

(d) simultaneously with step (c) adding aqueous solution of the at least one additive in the form of a liquid cylindrical mantle concentrically surrounding said extruded core; and

(e) transporting said extruded core with concentric mantle thereabout through an outlet tube to an application nozzle.

4,708,746

METHOD THE HYDROLYTIC SPLITTING OF ACID TREATED COMMINUTED CRUDE CELLULOSE WITH STEAM

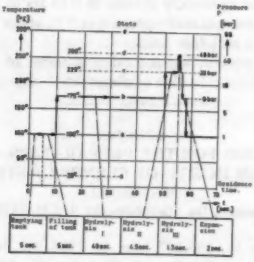
Klaus-Jürgen Hinger, Stuttgart, Fed. Rep. of Germany, assignor to Werner & Pfleiderer, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 443,854, Nov. 22, 1982, abandoned. This application Dec. 18, 1984, Ser. No. 683,183

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1981, 3149587

Int. Cl.[4] C13K *1/02*

U.S. Cl. 127—37 **1 Claim**



1. Method of acid-catalyzed hydrolytic splitting of cellulose to produce sugar, which method comprises treating comminuted crude cellulose pulp with acid in a concentration of 0.5 to 10% and draining the pulp, wherein the material to be hydrolyzed is drained to 10 to 80% of moisture and heated to a temperature of approximately 100° C., placing the heated drained pulp in a reaction vessel, feeding steam into said reaction vessel in three successive discrete reaction stages, and wherein said steam being fed in a first reaction stage I to increase the temperature to 175° C. and the pressure to approximately 9 bar during a reaction time of about 40 seconds, said steam being successively fed in a second reaction stage to increase the temperature to 225° C. and the pressure to about 26 bar during a reaction time of about 4.5 seconds, and said steam being successively fed in a third reaction stage to increase the temperature to approximately 260° C. and the pressure to 48 bar during a reaction time of 1.3 seconds, and effecting a rapid expansion of said steam subsequent to the third reaction stage within about 5 seconds of time, and wherein steam from different expansion stages is conducted to separate pressure reservoirs and the waste steam of a (n+1)st stage is used to control the reaction conditions of a (n)th reaction stage of the respective next complete reaction stage course.

4,708,747

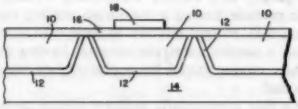
DIELECTRIC FOR LASER TRIMMING

William E. O'Mara, Jr., Melbourne, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed Oct. 16, 1986, Ser. No. 919,465

Int. Cl.[4] H01L *21/265*

U.S. Cl. 437—19 **2 Claims**



1. A method of laser trimming comprising:

forming an element of laser-trimmable material above a layer of semiconductor material which is on a layer of dielectric material; and

subjecting said element to laser radiation having a wave length aproximately equal to twice the thickness of said layer of dielectric material times the refractive index of said layer of dielectric material divided by an integer to remove portions of said laser-trimmable material.

4,708,748

METHOD OF MAKING COLD ROLLED DUAL-PHASE STRUCTURE STEEL SHEET HAVING AN EXCELLENT DEEP DRAWABILITY

Susumu Satoh; Hideo Suzuki; Takashi Obara; Minoru Nishida, and Osamu Hashimoto, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Division of Ser. No. 790,641, Oct. 23, 1985, Pat. No. 4,615,749, which is a continuation of Ser. No. 591,406, Mar. 20, 1984, abandoned. This application Jul. 3, 1986, Ser. No. 881,915

Claims priority, application Japan, Feb. 18, 1984, 59-27995

Int. Cl.[4] C21D *8/04*

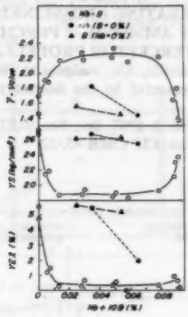
U.S. Cl. 148—2 **3 Claims**

1. A method of manufacturing a cold rolled dual-phase structure steel sheet to obtain a sheet having deep drawability ($\bar{r}$-value), comprising the steps of:

selecting a steel slab with a composition containing 0.001–0.008% by weight of C, not more than 1.0% by weight of Si, 0.05–1.8% by weight of Mn, not more than 0.15% by weight of P, 0.01–0.10% by weight of Al, and combining 0.002–0.050% by weight of Nb and 0.0005–0.0050% by weight of B provided that the combined value of Nb(%)+10B(%) is in a range of 0.010–0.080% by weight, hot and cold rolling said steel slab to obtain a steel sheet; and

continuously annealing the said steel sheet in such a manner that the steel sheet is heated and soaked at a temperature from $\alpha \rightarrow \gamma$ transformation point to 1,000° C. and then

cooled at an average cooling rate of not less than 0.5° C./sec but less than 20° C./sec in a temperature range of from the soaking temperature to 750° C., and subsequently



at an average cooling rate of not less than 20° C./sec in a temperature range of from 750° C. to not more than 300° C.

4,708,749

METHOD OF CALIBRATING VEHICLE WHEELS TO A FINISHED SIZE

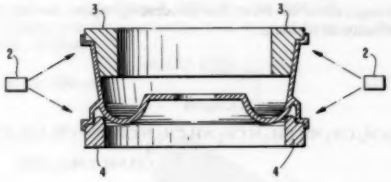
Otto Berg, Asker, Norway, assignor to Ardal OG Sunndal Verk A.S., Oslo, Norway

Filed Nov. 26, 1985, Ser. No. 802,218

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1984, 3443207

Int. Cl.⁴ C22F *1/04*

U.S. Cl. 148—11.5 A **6 Claims**



1. A method of calibrating to a desired finished size the rim of an aluminum wheel which has undergone a solution heat treatment, said method comprising:

positioning said wheel, at a first temperature substantially equal to the temperature of the wheel after removal thereof from said solution heat treatment, in a die;

heating said die to a second temperature lower than said first temperature;

cooling said wheel to a third temperature lower than said second temperature, and thereby causing said rim to shrink tightly over said die to said desired finished size; and

interrupting said cooling such that said rim is heated by heat from said die and thereby is expanded by an amount sufficient to remove said rim from said die.

4,708,750

THERMAL TREATMENT OF WROUGHT, NICKEL BASE SUPERALLOYS IN CONJUNCTION WITH HIGH ENERGY HOLE DRILLING

Thomas T. Field, East Killingly; Thomas A. Murrin, and Earle A. Ault, both of South Windsor, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 23, 1985, Ser. No. 812,107

Int. Cl.⁴ C22F *1/10*

U.S. Cl. 148—11.5 N **10 Claims**

1. A method for fabricating a wrought, polycrystalline, carbon containing superalloy article having a plurality of small diameter, closely spaced apart holes therein, wherein the article is a nickel or cobalt base material, and has good fatigue strength and creep strength, comprising the steps of:

(a) first heat treating the article to produce therein an average grain size of ASTM No. 6-9 and a substantially discontinuous carbide phase precipitate along the boundaries of said grains;

(b) piercing the holes in the article with a high energy beam; and then

(c) second heat treating the article to produce therein an average grain size of ASTM No. 4-8.

4,708,751

HALOGEN-FREE FOAM FLUXES

Gerd Froebel, Dusseldorf, and Hans W. Stang, Duisburg, both of Fed. Rep. of Germany, assignors to Alpha Grillo-Lotsysteme GmbH, Duisburg-Hamborn, Fed. Rep. of Germany

Filed Oct. 23, 1985, Ser. No. 790,618

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1984, 3445624

Int. Cl.⁴ B23K *35/34*

U.S. Cl. 148—23 **6 Claims**

1. A halogen-free foam flux for the mechanized soft soldering of heavy metals comprising

a solvent,

at least one dicarboxylic acid activator having from 4 to 12 carbon atoms, and

a foaming agent, wherein

(a) said foam flux is halogen-free;

(b) said activator is present in an amount less than 3.5% by weight;

(c) said foaming agent is present in an amount of from 0.2 to 3% by weight; and

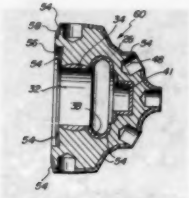
(d) the total solids and foaming agent content is less than 6% by weight.

4,708,752

PROCESS FOR LASER HARDENING DRILLING BIT CONES HAVING HARD CUTTER INSERTS PLACED THEREIN

Nareshchandra J. Kar, Westminster, Calif., assignor to Smith International, Inc., Newport Beach, Calif.

Filed Mar. 24, 1986, Ser. No. 843,048
Int. Cl.[4] C21D *1/09, 9/22*
U.S. Cl. 148—127 4 Claims



1. A process for forming a tool having a hard cutter insert, the process comprising the steps of:

forming a tool blank from a medium to high carbon hardenable steel, the tool blank having an external surface;

applying a coating to the external surface to render the external surface dark and absorbent to laser light;

after the step of applying the coating, forming at least one hole for the hard cutter insert, and affixing the hard cutter insert into the hole, the hard cutter insert having shiny light reflecting external surfaces, to provide a first intermediate tool blank, the first intermediate tool blank thereby including dark light absorbent surfaces and also reflective surfaces relatively unabsorbent to laser light;

after the step of affixing the hard cutter insert into the hole, bombarding the external surface of the first intermediate tool blank with a laser beam that is principally focused on the external surface of the first intermediate tool blank, the laser beam being of sufficient intensity and operated for sufficient time so as to austenitize an external layer in the light absorbent external surface of the first intermediate tool blank, the external surface of the hard cutter insert being out of focus when exposed to the laser beam; and

cooling the austenitized layer sufficiently rapidly to form martensite in the external layer of the light absorbent external surface, whereby the tool is obtained having a hardened external case.

4,708,753

WATER-IN-OIL EMULSIONS

John W. Forsberg, Mentor-on-the-Lake, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Continuation of Ser. No. 806,164, Dec. 6, 1985, abandoned, Continuation of Ser. No. 806,164, Dec. 6, 1985, abandoned. This application Dec. 29, 1986, Ser. No. 947,441
Int. Cl.[4] C06G *45/00*
U.S. Cl. 149—2 51 Claims

1. A water-in-oil emulsion comprising:

(A) a continuous oil phase;

(B) a discontinuous aqueous phase;

(C) a minor emulsifying amount of at least one salt derived from (C)(I) at least one hydrocarbyl-substituted carboxylic acid or anhydride, or ester or amide derivative of said acid or anhydride, the hydrocarbyl substituent of (C)(I) having an average of from about 20 to about 500 carbon atoms, and (C)(II) at least one amine; and;

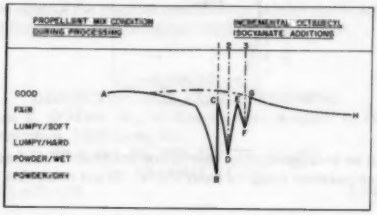
(D) a functional amount of at least one water-soluble, oil-insoluble functional additive dissolved in said aqueous phase; with the proviso that when component (D) is ammonium nitrate, component (C) is other than an ester/salt formed by the reaction of polyisobutenyl (Mn=950) substituted succinic anhydride with diethylethanolamine in a ratio of one equivalent of anhydride to one equivalent of amine.

4,708,754

METHOD OF GENERATING CROSSLINKING SITES ON THE SURFACE OF AMMONIUM PERCHLORATE IN SOLID INTERCEPTOR PROPELLANTS

David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

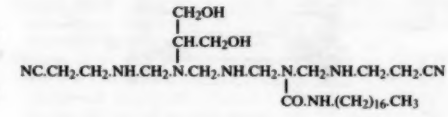
Filed Feb. 2, 1987, Ser. No. 10,021
Int. Cl.[4] C06B *45/22*
U.S. Cl. 149—11 3 Claims



1. A method of generating reactive crosslinking sites on the surface of the ammonium perchlorate particles contained in a high-burning rate solid propellant composition comprised of about 88 weight percent solid portion and of about 12 weight percent liquid portion, said solid portion comprised of ultrafine and fine ammonium perchlorate in a proportion ratio of about 90 parts to about 10 parts of aluminum powder, said liquid portion comprised of hydroxy-terminated polybutadiene propolymer containing an isocyanate curative of a mixture of isophorone diisocyanate and a trifunctional isocyanate, said method comprising:

(i) combining the following ingredients A,B,C, and D in weight ratios of 798, 2466, 954, and 281 respectively to form a blend, said ingredient A being 1,3,5,7,9-pentaazanonane, said ingredient B being acrylonitrile, said ingredient C being oxiranylmethanol, and said ingredient D being octadecyl isocyanate;

(ii) allowing said blend to react for about one hour at room temperature to form the processing agent having the structural formula:



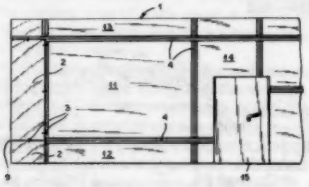
said processing agent being further defined as the condensation product of octadecyl isocyanate and the glycidol reaction product of cyanoethyl-substituted tetraethylenepentamine;

(iii) adding an effective amount from about 0.1 weight percent to about 0.4 weight percent of said processing agent to said high-burning rate solid propellant during the mixing of said propellant wherein said processing agent coats said ammonium perchlorate to achieve a nonpolar interaction between said processing agent and said propellant prepolymer to cause propellant mix to remain fluid during mixing cycle and to additionally result in a considerable shortening of the mixing cycle as compared with a mixing cycle where no processing agent is used, and wherein reactive crosslinking sites are generated on surface of said ammonium perchlorate as a result of said coating.

4,708,755
METHOD OF FACILITATING THE COVERING OF LARGE SURFACES

José A. Lambelet, 523 Harvard Rd., San Mateo, Calif. 94402

Filed Jan. 17, 1983, Ser. No. 458,253
Int. Cl.[4] E04B *2/00*
U.S. Cl. 156—64 1 Claim



1. A method of lining a large surface with a precisely coextensive covering therefor,

comprising the steps of:

(a) pasting strips of adhesive measuring tape along orthogonally intersecting lines onto said surface to divide the area thereof into zones at least some of whose boundaries are undetermined in advance, said strips being provided on their exposed faces with longitudinal centerlines representing the boundaries of adjoining zones, each strip further carrying two sets of numerical markings on opposite sides of its centerline;

(b) reading the dimensions of said zones on said markings;

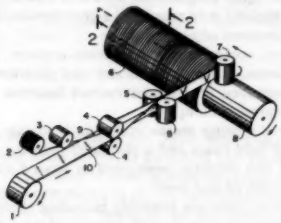
(c) cutting sections of said covering to sizes commensurate with the read dimensions of zones with previously undetermined boundaries; and

(d) applying said sections to corresponding zones, the covering of a zone terminating at the centerline of a strip while leaving free the set of markings on the side of a zone still to be covered.

4,708,756
PROCESS OF PRODUCING A PLIABLE ROLLER

Dietmar Büsen, Fürth; Helmut Schlüter, Reichelsheim; Arnold Weghmann, Weinheim-Lützelsachsen; Norbert Blümler, Hemsbach, and Bohuslav Tecl, Weinheim-Lützelsachsen, all of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim, Fed. Rep. of Germany

Filed Sep. 5, 1986, Ser. No. 904,508
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1985, 3533045
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—143 12 Claims



1. A process of producing a pliable roller, comprising:

providing a flexible strip of material with a tension element longitudinally therealong, the tension element having a lesser longitudinal extensibility than the flexible strip of material;

fixing the tension element and the flexible strip of material immovably together so as to prevent substantial relative longitudinal movement of the tension element and flexible strip of material during subsequent winding about a roller core;

longitudinally folding together portions of the flexible strip of material with the tension element therebetween; and

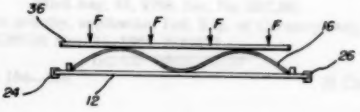
at least after the fixing, winding the flexible strip of material with the tension element longitudinally therealong longitudinally about a roller core in such a manner as to form adjacent windings thereabout;

whereby the tension element prevents uneven stretching of the flexible strip of material during winding.

4,708,757
METHOD OF FORMING CORRUGATED PANEL

Walker L. Guthrie, 328 Pine Ridge Rd., Red Bank, Tenn. 37415

Filed Jul. 21, 1986, Ser. No. 887,448
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—163 14 Claims

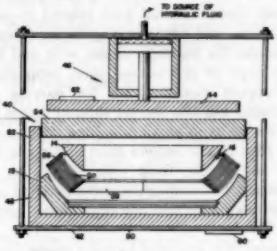


1. The method of forming a corrugated panel having a corrugated sheet of material including alternate ridges and furrows intermediate first and second surface sheets, at least said corrugated sheet comprising an elastically deformable material, said method comprising holding said first sheet in a stretched condition, fastening to said first sheet spaced ends of the sheet to be corrugated defined as a third sheet, the remainder of said third sheet being spaced from the first sheet, applying a gradual compressive force substantially equally over said third sheet directed toward said first sheet to flex said third sheet gradually into a selective number of wave forms having alternate ridges and furrows, the furrows abutting said first sheet, securing said furrows to said first sheet, securing said second sheet to said third sheet at said ridges, and releasing the first sheet.

4,708,758
METHOD OF MAKING A FLEXIBLE BEARING

James D. McGregor, Logan, Utah, assignor to Morton Thiokol, Inc., Chicago, Ill.

Filed Sep. 25, 1986, Ser. No. 911,548
Int. Cl.[4] B32B *31/20*
U.S. Cl. 156—245 3 Claims



1. The method of making a flexible bearing that is fabricated of first and second rigid end rings with flexible laminations therebetween consisting of alternating layers of elastomeric material and rigid reinforcement shims made of suitable fabric material impregnated with a resin, wherein the surface of each of the first and second end rings adjacent the lamination and

the surfaces of the layers of elastomer and rigid reinforcement shims of the lamination conform to surfaces of concentric spheres, comprising the steps of:

fitting together the end rings and lamination materials into an assembly of desired geometry with the resin impregnated fabric material being uncured, where, prior to fitting together the end rings and lamination into an assembly, each of the layers of resin impregnated fabric material is formed into a reinforcement preform by pressing and compacting, wherein the reinforcement preforms are formed one at a time in a first mold configured to make the surfaces of the preforms conform to the surfaces of concentric spheres, and wherein the first mold is placed in a press for effecting pressing and compacting each preform, and

subjecting the assembly to heat and pressure thereby to cause cure and vulcanization of the elastomeric material and reinforcement shims.

4,708,759

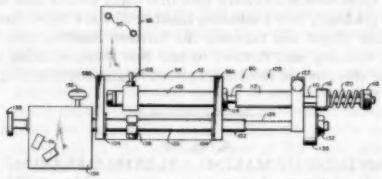
EDGE LOCATING DEVICE

Thomas M. Porat, Weare, N.H., assignor to Crathern Engineering Co., Inc., Contoocook, N.H.

Filed Sep. 30, 1985, Ser. No. 782,130

Int. Cl.[4] B32B *31/00*; **B65H** *7/02, 9/10*

U.S. Cl. 156—360 **22 Claims**



1. A system for laminating at least a first sheet of material to a second sheet of material, said system comprising, in combination:

first support means for supporting said first sheet;

second support means for supporting said second sheet

edge locating means secured with respect to said second support means, said edge locating means including edge contact means for making contact with and locating at least one edge of said second sheet supported by said second support means, means for moving said edge contact means and said second support means relative to one another so as to move said edge contact means and said one edge of said second sheet into contact with one another, and means, fixed with respect to said edge contact means, for locating the corresponding edge of said first sheet relative to said one edge of said second sheet; and

means, responsive to said edge locating means, for moving at least one of said support means relative to the other so as to move said sheets into a predetermined alignment relation so that said one edge of said second sheet is disposed in a predetermined position relative to the corresponding edge of said first sheet, and for moving said sheets into contact with one another so as to laminate said sheets in said alignment relation.

4,708,760

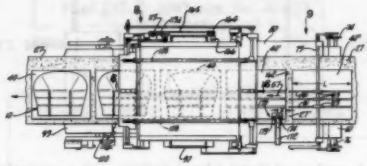
CUTTING AND HEAT SEALING APPARATUS FOR VEHICLE SEAT INSERTS

Alfred J. Mark, Newtonville, and Joseph H. P. Debettin, Whitby, both of Canada, assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Nov. 4, 1985, Ser. No. 795,004

Int. Cl.[4] B32B *31/10, 31/12, 31/20*

U.S. Cl. 156—362 **2 Claims**



1. An apparatus for manufacturing a laminated fabric panel and riser insert for automobile seats comprising:

a web feeding section comprising a chain drag conveyor assembly operative for intermittently advancing a continuous web made of urethane sheet foam riser material in a downstream direction;

a plurality of rectangular-shaped cover panels of predetermined identical length and width supported on the upper surface of said web for travel therewith, said cover panels being longitudinally arranged with transverse exposed web spacing strip portions therebetween;

a sewing machine station comprising a plurality of sewing machines for stitching each cover panel to its underlying portion of said web;

a press station at a predetermined location downstream from said sewing machine station comprising first and second press members including power means connected to said press members for accommodating pressure engagement therebetween;

a cutting and heat-sealing die having upstream and downstream transverse edges said die carried by one of said press members, said die comprising a heated cutting rule adapted to engage each said cover panel and an associated underlying web portion stitched thereto at said predetermined location to effect cutting and heating sealing between perimeter portions of each cover panel and its associated underlying stitched web portion providing a cut and heat sealed border outlining a laminated seat insert, the improvement wherein;

said panels being manually positioned on said web with the transverse web spacing strips between adjacent panels defining unequal longitudinal distances characterized by each said spacing strip providing a predetermined minimal distance between adjacent panels;

control means comprising an electronic counter, photocell sensing means, and encoder means; said photocell sensing means positioned at a predetermined location upstream from said press station;

said photocell sensing means including a source projector emitting a light beam and a photocell detector with said projector and detector positioned in spaced relation on opposite sides of said web;

said chain drag conveyor assembly including electric motor means having an output shaft connected by a first drive belt to said chain drag conveyor assembly, said output shaft further connected by a second drive belt to an encoder shaft;

said encoder means operative for reading the revolutions of said encoder shaft and transmitting corresponding driving pulses to said electronic counter, whereby upon said counter counting-out after receiving a preset number of pulses causing said control circuit to successively position

each advancing panel trailing edge in exact alignment with said die upstream edge;

said light beam of a predetermined intensity such that it is blocked from penetrating both a panel and its underlying web portion, said light beam intensity being such that it is transmitted through each said web spacing strip portion intermediate adjacent downstream and upstream panels for reception by said detector so as to turn said detector on as the trailing edge of each panel is advanced downstream past said light beam thereby activating said control means electronic counter;

upon the downstream panel trailing edge and said web being advanced past said light beam a distance equal to said panel length, said counter receiving a preset number of pulses from said encoder means wherein the movement of said web is temporarily stopped by said control means positioning the downstream panel at a rest interval with its trailing edge positioned in exact alignment with said die upstream edge;

wherein the next following upsteam panel is positioned with its trailing edge spaced a variable predetermined minimal distance upstream from said light beam such that, together with its underlying web portion, the next upstream panel blocks said light beam deactivating said photocell detector and resetting said counter to zero time;

said control means operative during said rest interval to cause said press members to close whereby the downstream cover panel and its underlying web portion are cut and heat-sealed forming a laminated insert upon pressure engagement of said press members; and

wherein said control means operative to advance said web such that the laminated insert is transported therewith downstream from said press station for removal from said web resulting in the continuous production of laminated inserts.

4,708,761

LAMINATING APPARATUS FOR PREPREG MATERIALS

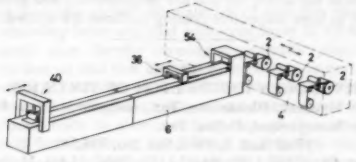
Akira Taniguchi, Kakamigahara; Kuniji Ojio, Gifu; Tatsuya Yamamoto, Kakamigahara, and Toshikazu Sana, Konan, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Oct. 23, 1986, Ser. No. 922,476

Claims priority, application Japan, Oct. 25, 1985, 60-238631

Int. Cl.[4] B32B *31/18*

U.S. Cl. 156—516 **5 Claims**



1. A laminating apparatus for multi-laminating different kinds of prepreg material sheets including roll stocker means provided with a plurality of rolls of different kinds of prepreg material tape on a common axis, lay-up table means disposed so as to face said roll stocker means at one end thereof, said rolls and said lay-up table means being movable with respect to each other in parallel with the common axis, cutting means for cutting said prepreg material tape into sheets disposed between said roll stocker means and said lay-up table means, pulling out means provided on said lay-up table means to be movable in the longitudinal direction thereof for pulling said prepreg material tape out from said rolls, and compaction head means provided on said lay-up table means for compacting said prepreg material sheet to be movable along the longitudinal direction of said lay-up table means independently of the movement of said pulling out means.

4,708,762

APPARATUS FOR JOINING TWO PANES OF GLASS TO FORM A FUSED SPACE WINDOW PANE

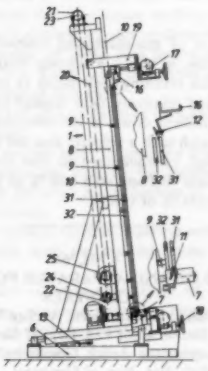
Karl Lenhardt, Neuhausen-Hamberg, Fed. Rep. of Germany, assignor to Lenhardt Maschinenbau GmbH, Neuhausen-Hamberg, Fed. Rep. of Germany

Filed Aug. 15, 1986, Ser. No. 897,493

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1985, 3529520; Nov. 11, 1985, 3539877

Int. Cl.[4] B65H *29/20*

U.S. Cl. 156—556 **31 Claims**



1. An apparatus for joining two panes of glass to form an edge-sealed pane of insulating glass by the injection of a strip of material, said material being initially paste-like and subsequently hardening and adhering to the two panes of glass to its whole extent along the edge of the panes in the space between the two panes that are, at least on one of their major surfaces, supported and aligned, and held at a distance from each other so as to be parallel, with at least one nozzle that is arranged on a horizontal conveyor for the two panes that are held at a distance from each other, characterized in that the horizontal conveyor (**3, 4, 41**) is provided with supporting elements (**9**; **11, 12**) that are separated over one of their major surfaces, of which some define a plane hereinafter referred to as the plane of movement of the panes (**10**), whereas the other define a plane that is parallel thereto, these being moveable by means of an operating system, either individually or in groups, out of engagement with the pane of glass (**31**) that is arranged at a distance from the plane of movement of the panes (**10**); in that the one nozzle (**36**), in the case of a plurality of nozzles (**36, 36*a***) at least one (**36**) of them, being moveable parallel to the plane of movement of the panes (**10**) at least transversely to the direction of movement (x) of the horizontal conveyor (**3, 4, 41**); and in that the outlet orifices (**53, 54**) of each nozzle (**36, 36*a***) are provided with a separator (**55**) that precedes them, and which penetrates the space between the two panes of glass (**31, 32**).

4,708,763

METHOD OF MANUFACTURING BISMUTH GERMANATE CRYSTALS

Leonardus A. H. van Hoof, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 759,999, Jul. 29, 1985, abandoned. This application Dec. 9, 1986, Ser. No. 940,237

Claims priority, application Netherlands, Aug. 23, 1984, 8402575

Int. Cl.[4] C30B *11/04, 11/08*

U.S. Cl. 156—616 R **1 Claim**

1. A method of manufacturing bismuth germanate ($Bi_4Ge_3O_{12}$) crystals, in which a starting mixture is melted in a crucible and the resulting melt being in contact with a seed crystal is moved relatively with respect to a furnace with a temperature gradient down in the direction of said temperature-gradient with such a velocity that the crystal grows from the seed crystal, characterized in that the starting mixture contains between 40.2 and 40.5 mol.% of Bi_2O_3 and between 59.8 and 59.5 mol.% of GeO_2.

4,708,764

METHOD OF AND APPARATUS FOR GROWING CRYSTALS

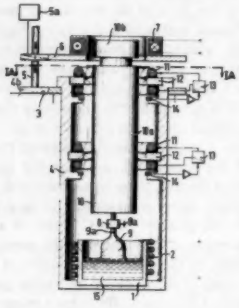
Karl Boden, Julich; Harald Ibach, Aachen-Verlautenheide, and Udo Linke, Duren, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Fed. Rep. of Germany

Filed Sep. 4, 1985, Ser. No. 772,558

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1984, 3432467; Aug. 9, 1985, 3530417

Int. Cl.[4] C30B *13/28, 15/20, 15/30*

U.S. Cl. 156—617 R **19 Claims**



1. In a method of producing a crystalline body which comprises the steps of:

(a) seed pulling or zone melting a bar member from a melt of a crystalline material on a source member at a crystallization interface by moving at least one of said members in a generally axial direction;

(b) during the formation of said bar member magnetically suspending at least one of said members so that a generally axial displacement thereof can be effected in a substantially frictionless manner, said one of said members being connected with a magnetizable core; and

(c) magnetically stabilizing said core by enclosing same in an array of electromagnets of a radial stabilizer so that an annular gap is provided between said core and said array by detecting the position of said core with respect to said array and controlling electrical energization of said electromagnets in response to the detected position of the core; the improvement which comprises the step of:

(d) imparting a transverse displacement to said core and to the axis thereof by controlled energization of said electromagnets to effect relative transverse displacement of said members and thereby moving the axis of the bar member around the melt and effecting two-dimensional intimate mixing of said melt at said interface.

4,708,765

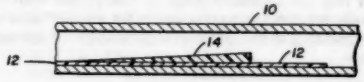
REGULATION OF THE EXPOSURE OF ACTIVE SURFACES

Arnold L. Newman, Kensington, and William D. Stanbro, Columbia, both of Md., assignors to The Johns Hopkins University, Baltimore, Md.

Filed Oct. 6, 1986, Ser. No. 915,602

Int. Cl.[4] B44C *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—626 **60 Claims**



1. A method of regulating the exposure of active surface comprising:

a. providing an active surface;

b. covering the active surface with an erodible protective coating;

c. exposing the coated, active surface to the action of an environment comprising a medium able to erode the protective coating; and,

wherein the nature of the coating varies so that first portions of the coating are eroded to expose the active surface portions thereunder before other portions are eroded, in such a way that portions of the active surface are progressively and gradually exposed as their respective coating portions are eroded.

4,708,766

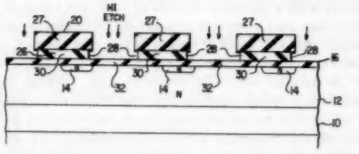
HYDROGEN IODIDE ETCH OF TIN OXIDE

Jaroslav Hynecek, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 7, 1986, Ser. No. 928,341

Int. Cl.[4] C23F *1/02;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—643 **26 Claims**



1. A method for etching a tin oxide layer deposited on a surface, comprising the steps of:

masking the tin oxide layer by selectively forming an etchant-resistant material thereon; and

isotropically etching the tin oxide layer with a gas etchant, such that substantially all of the exposed tin oxide is removed.

4,708,767

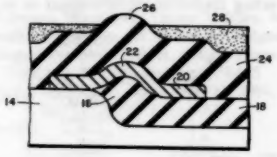
METHOD FOR PROVIDING A SEMICONDUCTOR DEVICE WITH PLANARIZED CONTACTS

Thijs W. Bril, Sunnyvale, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Filed Oct. 5, 1984, Ser. No. 658,323

Int. Cl.[4] B44C *1/22;* H01L *21/302, 21/31*

U.S. Cl. 437—18 28 Claims



1. A manufacturing method for providing a semiconductor device with an insulating layer having a generally planar surface and planar contacts according to the steps of:

providing a semiconductor body having active areas with a patterned first electrically conductive layer having at least a portion protruding upward beyond adjacent parts of said conductive layer;

forming a first electrically insulating layer on said first electrically conductive layer and on exposed adjacent parts of said semiconductor body in a manner such that a portion of said first insulating layer protrudes upwardly beyond adjacent parts of said first insulating layer generally at the location above the protruding portion of said first conductive layer;

forming an additional layer having a generally planar upper surface on said first electrically insulating layer;

exposing at least part of the protruding portion of said first electrically insulating layer by etching said additional layer with etchant that attacks the material of said additional layer at a significantly greater rate than the material of said first electrically insulating layer;

etching the remainder of said additional layer and said first electrically insulating layer, as it becomes exposed, with etchant that etches the materials of said first electrically insulating layer and said additional layer at substantially equal rates thereby forming a generally planar upper surface on said first electrically insulating layer;

forming at least one via to said first electrically conductive layer and at least one via to an active area of said semiconductor body by plasma etching through the remainder of said first insulating layer down to said first electrically conductive layer and to active areas of said semiconductor body;

forming, on the upper surfce of said first insulating layer, a second conductive metal layer of a thickness sufficient to at least partially fill all said vias;

at least one of said conductive layers being formed by vapor deposition;

forming on said second conductive layer a planarizing layer having a generally planar upper surface;

exposing at least part of said second conductive layer by etching said planarizing layer with etchant that attacks material of said planarizing layer at a significantly greater rate then material of said second conductive layer;

and then etching said planarizing layer and said second conductive layer, as it becomes exposed, with etchant that attacks said second conductive layer and said planarizing layer at substantially equal rates until the upper surface of said first insulating layer is exposed.

4,708,768

SEMICONDUCTOR DEVICE FABRICATION PROCESS

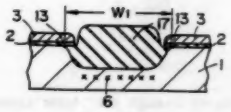
Osaomi Enomoto, and Katsuo Komatsuzaki, both of Miho, Japan, assignors to Texas Instruments, Dallas, Tex.

Filed Mar. 10, 1987, Ser. No. 24,238

Claims priority, application Japan, Mar. 17, 1986, 61-60421

Int. Cl.[4] B44C *1/22;* C03C *15/00, 25/06*

U.S. Cl. 437—228 10 Claims



1. A semiconductor device fabrication process comprising the following sequential steps:

sequential formation of an oxide layer and first layer of a masking material that is resistant both to oxidation and heat on a principal plane of semiconductor substrate;

patternwise removal of these two layers at overlapping positions to form wells with the above semiconductor substrate exposed at bottom;

selective removal of said oxide layer only around said wells to leave recesses;

deposition of a second layer of masking material resistant both to oxidation and heat on the exposed surfaces of semiconductor substrate at the bottom of said wells and also in said recesses;

removal of said second layer of masking material from the bottom of wells with the masking material left in said recesses; and

selective oxidation of exposed surfaces of semiconductor substrate under masking with the remaining first and second layers of masking material.

4,708,769

TEMPERATURE DEPENDENT ELECTRIC RESISTOR PROBE AND A METHOD OF MAKING THE SAME

Kurt Burger, Friolzheim; Heinz Friedrich, Gerlingen; Thomas Mölkner, and Peter Schöttle, both of Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE85/00247, § 371 Date Feb. 21, 1986, § 102(e) Date Feb. 21, 1986, PCT Pub. No. WO86/01290, PCT Pub. Date Feb. 27, 1986

PCT Filed Jul. 19, 1985, Ser. No. 852,808

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1984, 3430075

Int. Cl.[4] H01L *21/312;* C03C *15/00*

U.S. Cl. 156—659.1 6 Claims

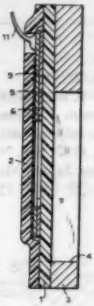
1. A method of making a temperature dependent electric resistor probe, particularly for measuring temperature of intake air mass and/or fuel mass in internal combustion engines, comprising the steps of

(a) preparing a planar support element defining two opposite major sides; then

(b) securing a support foil of a temperature resistant plastic material on one of said major sides; then

(c) applying a layer of temperature dependent electrically resistive material on the support foil and finishing the

resistive layer into a measuring resistor layer on the other side; and then



(d) forming a recess through the planar support element from the other major side of the planar support element in a region opposite the finished measuring resistor layer.

4,708,770

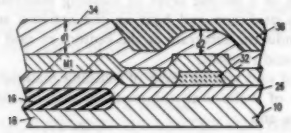
PLANARIZED PROCESS FOR FORMING VIAS IN SILICON WAFERS

Nicholas F. Pasch, Mountain View, Calif., assignor to LSI Logic Corporation, Santa Clara, Calif.

Filed Jun. 19, 1986, Ser. No. 876,019

Int. Cl.[4] C03C *15/00*; C23F *1/02*; H01L *21/312*

U.S. Cl. 156—662 **7 Claims**



1. A process for forming vias in a silicon wafer comprising the steps of:

forming a field oxide region on a substrate;

forming a diffusion region adjacent to said field oxide region on said substrate wherein said field oxide region is at a height different from said diffusion region;

depositing dielectric material extending over said oxide and diffusion regions;

configuring a pillar from a portion of said dielectric material at a first via location so that the top surface of said pillar is substantially at the same height as the top surface of said dielectric material at a second via location and a layer of said dielectric material remains over said field oxide and diffusion regions;

depositing a metallization layer over said dielectric material including said pillar;

coating said metallization layer with a planarized dielectric; and

etching vias at said first and second locations.

4,708,771

TWO STAGE PROCESS FOR SULFONATING MECHANICAL PULP FIBERS

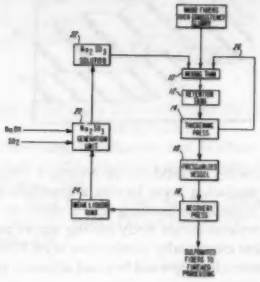
Serge B. Beaulieu, Mechanicsville, Va., assignor to Bear Island Paper Company, Ashland, Va.

Filed Dec. 31, 1984, Ser. No. 687,977

Int. Cl.[4] D21C *3/04, 3/26*

U.S. Cl. 162—83 **12 Claims**

1. For use in a process for producing pulp suited for newsprint and other specialty grade papers wherein the furnish is presented in a slurry form the solids content of which comprises wood fibers, a procedure enhancing the properties of said fibers comprising the steps of mixing a first portion of said slurry and a sulfite solution in relatively proportioned amounts to the extent necessary to effect a reduction in the consistency of said slurry to a level which is relatively low and not materially in excess of 7% and place the fiber content of said slurry, to the extent of the exposure thereof, into individual intimate contact with small portions of the sulfite in said solution to initiate a sulfonation thereof, thereafter holding said mixture in a relatively quiescent state and in an environment the temperature of which does not exceed 212° F. for a period of time not less than about ten minutes during which said sulfonation of the fiber content of said slurry is propagated to a level of at least about 0.5% to essentially complete a first stage sulfonation of said fibers, then increasing the consistency of said mixture by extracting therefrom liquid content in an amount to



carry therewith a major portion of the sulfite content of the solution first applied to said slurry with which it has been mixed in relatively proportioned amounts and immediately mixing said extracted liquid content together with a minor supplemental amount of said sulfite in solution and a further portion of said furnish the fiber content of which is to be sulfonated in a manner similar to that of the first said portion of said slurry, and subjecting said increased consistency remainder of said mixture of said first portion of said slurry and the said solution mixed therewith to a temperature in excess of 212° F. and a corresponding above atmospheric pressure to cause the sulfite in the slurry to further react on and provide said fiber content with a sulfonate level in excess of 0.9% to economically provide a pulp specially suited for use and application in various manner and proportion in the production of a mechanical pulp furnish especially suited for the production of newsprint and/or specialty grade papers.

4,708,772

PAPER PRODUCTS CONTAINING WET STRENGTH RESINS

William W. Maslanka, Landenberg, Pa., assignor to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 689,739, Jan. 8, 1985, Pat. No. 4,605,709, which is a continuation of Ser. No. 517,159, Jul. 25, 1983, abandoned, and a continuation-in-part of Ser. No. 488,894, Apr. 27, 1983, abandoned. This application May 15, 1986, Ser. No. 863,658

The portion of the term of this patent subsequent to May 7, 2002, has been disclaimed.

Int. Cl.[4] D21H *3/58*

U.S. Cl. 162—164.3 **7 Claims**

1. A paper product having wet and dry strength and improved repulpability comprising sheeted cellulose fibers treated with from about 0.2 to about 3% by weight, based on dry weight of fibers, of a water-soluble, cationic thermosetting resin derived by reacting methylbisaminopropylamine with (a) a diester of oxalic acid and (b) a diester of a saturated aliphatic

dicarboxylic acid containing at least 4 carbon atoms to form a polyamino-copolyamide containing tertiary amine groups, the mole ratio of (a) to (b) being from about 0.25:1 to about 10:1 and the mole ratio of methylbisaminopropylamine to the diesters being from about 0.9:1 to about 1.2:1 and then reacting the polyamino-copolyamide, in aqueous solution with from about 1 mole to about 1.5 moles of epihalohydrin per mole of tertiary amine groups present in said polyamino-copolyamide.

4,708,773

IMPERMEABLE PLATE FOR UNIFORMLY DISPERSING PAPER RAW MATERIAL IN A TWIN WIRE PAPER FORMER

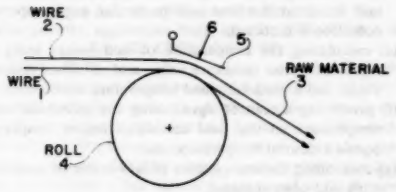
Haruyoshi Fujiwara, Hiroshima; Tetsuo Makino, Mihara, and Hiroshi Iwata, Hiroshima, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 5, 1985, Ser. No. 772,675

Claims priority, application Japan, Sep. 12, 1984, 59-189751

Int. Cl.[4] D21F *1/36, 1/00*

U.S. Cl. 162—300 **2 Claims**



1. An apparatus for dewatering and uniformly dispersing raw paper material processed in combination with a twin-wire paper former, the paper former comprising a first wire traveling along a first closed looped path over a guide means located in a dewatering zone and a second coacting wire traveling along a second closed-looped path and coacting with and substantially parallel to said first wire in the dewatering zone, the raw paper material traveling between the first and the second coacting wires in the dewatering zone, said apparatus comprising:

a dewatering limit member having a generally flat portion impermeable to water being adjustably positioned over the guide means located in the dewatering zone and between which the first wire, the second wire and the raw paper material traveling between the first and second wires extend, said generally flat portion comprising a plate; and

urging means for urging said flat portion of said adjustably positioned dewatering limit member toward and away from the guide means into and out of contact with the second wire for pressing the second wire, the raw paper material and the first wire between said substantially flat portion and the guide means to exert a pressure gradient on the raw paper material while the raw paper material travels between the first and the second wires in the dewatering zone for dewatering and uniformly dispersing the raw paper material in the dewatering zone,

said urging means comprising a pressing device for moving said plate into and out of contact with the second wire to press the second wire, the raw paper material and the first wire between said plate and the guide means in a wedge-like manner to exert said pressure gradient on said raw paper material while the raw paper material travels between the first and the second wires in the dewatering zone.

4,708,774

COAL COMPACTOR ROD RETAINER

Gerhard Turner, Überherrn, Fed. Rep. of Germany, assignor to Saarbergwerke AG, Saarbrucken, Fed. Rep. of Germany

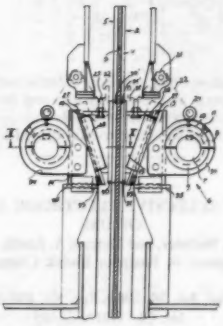
PCT No. PCT/DE85/00510, § 371 Date Aug. 4, 1986, § 102(e) Date Aug. 4, 1986, PCT Pub. No. WO86/03509, PCT Pub. Date Jun. 19, 1986

PCT Filed Dec. 6, 1985, Ser. No. 897,060

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1984, 3445068

Int. Cl.[4] C10B *45/02;* **B30B** *11/00*

U.S. Cl. 202—239 **7 Claims**



1. A compacting rod retainer for a coal compactor, comprising:

an upright compacting rod in the form of an I-beam;

a pair of compacting rod retainers disposed on opposite sides of said rod, and each said retainer comprising:

a rotatable drive shaft,

a bushing eccentrically mounted on said shaft for rotation therewith,

a linearly reciprocatable carrier engaging said bushing in a non-rotatable manner and extending transversely thereof, and

a clamping wedge slidably mounted on said carrier and juxtaposed with a web of said rod, whereby upon rotation of said shaft and the associated bushing, said carrier is displaced towards said compacting rod to engage said web with said wedge or to release said web from engagement with said wedge.

4,708,775

DISPOSAL OF WASTES WITH SOLVENT RECOVERY

Ian R. McGregor, Mississauga; D. Keith Jackson, Don Mills; Walter F. M. Brown, and Kenneth Burrell, both of Mississauga, all of Canada, assignors to Anachemia Solvents Limited, Mississauga, Canada

Filed Jul. 8, 1985, Ser. No. 752,838

Int. Cl.[4] B01D *3/06*

U.S. Cl. 203—40 **15 Claims**

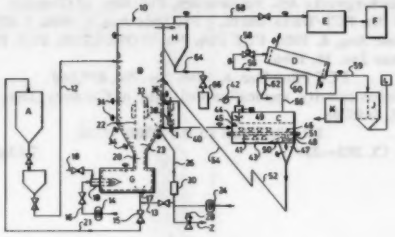
1. A process for recovering volatile matter from waste containing volatile matter and non-volatile matter comprising,

feeding a hot granular substrate into a closed chamber having an outlet for volatile matter and an outlet for said substrate and non-volatile matter,

contacting waste containing volatile and nonvolatile matter with said hot granular substrate in said chamber at a temperature effective to vaporize said volatile matter and forming a substantially free-flowing, noncaked mixture of said substrate and said non-volatile matter in said chamber, in which the granules of said hot granular substrate are coated with said non-volatile matter,

recovering the vaporized volatile matter from said chamber,

feeding said non-caked mixture from said chamber to a reactor,



thermally decomposing said non-volatile matter in said reactor to produce a gaseous exhaust and free said hot substrate of non-volatile matter, and

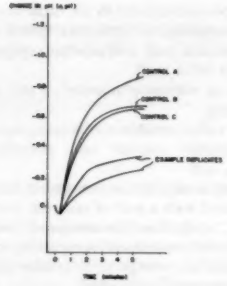
recycling said hot substrate to said closed chamber.

4,708,776

SODIUM ION SELECTIVE ELECTRODE AND METHOD OF USE

Joseph A. Roth, Webster, and Thomas A. Smith, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 28, 1986, Ser. No. 890,060
Int. Cl.[4] G01N *27/46*
U.S. Cl. 204—1 T **15 Claims**



1. A dry-operative sodium ion-selective electrode comprising:

(a) a dried reference electrode in contact with

(b) a dried reference layer buffered to a pH of from about 4 to about 8 with a water-soluble, organic dicarboxylic acid or salt thereof, which layer is in contact with one side of

(c) an ion-selective membrane composition comprising an ionophore for sodium ions, a compound capable of solvating said ionophore and a supporting matrix composed of a binder material.

4,708,777

METHOD AND APPARATUS FOR CONTROLLING HEATER OF A GAS SENSOR

Hiroaki Kuraoka, Oobu, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed Feb. 5, 1985, Ser. No. 698,546
Claims priority, application Japan, Feb. 6, 1984, 59-20341; Feb. 6, 1984, 59-20342
Int. Cl.[4] G01N *27/46*
U.S. Cl. 204—1 T **14 Claims**

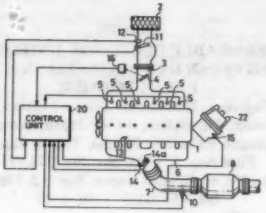
9. A method of controlling a heater of a gas sensor used for detecting the concentration of a gas component of exhaust gases from an internal combustion engine, comprising the steps of:

(a) detecting a temperature relating to said engine;

(b) detecting a particular engine operating condition of thermal equilibrium from which it is possible to estimate the temperature of said heater using said detected temperature relating to said engine;

(c) measuring an actual resistance value of said heater;

(d) calculating a reference resistance value of said heater at a predetermined reference temperature using said temperature relating to said engine and said actual resistance of said heater at the time said particular engine operating condition is detected;



(e) calculating the temperature of said heater using said measured heater resistance value, said reference resistance value, and a predetermined temperature coefficient;

(f) producing a control signal using the calculated heater temperature so that said calculated heater temperature equals a desired temperature; and

(g) controlling the energization of said heater in accordance with said control signal.

4,708,778

METALLIZING FIBER RE-INFORCED COMPONENT

Wolfgang Zankl, Friedrichshafen, Fed. Rep. of Germany, assignor to Dornier GmbH, Friedrichshafen, Fed. Rep. of Germany

Filed Aug. 6, 1986, Ser. No. 893,632
Int. Cl.[4] C25D *7/04*
U.S. Cl. 204—25 **10 Claims**

1. In a method of metallizing a part or component by means of electrolytic process, the part or component being made of a fiber re-inforced compound and being, at least in parts, hollow or concave, whereby a hollow or concave portion is not to be metallized, the improvement comprising:

providing the part or component with a wall extension adjacent the hollow or concave portion not to be metallized;

closing off and liquid tight sealing said hollow or concave portion under utilization of said wall extension so that a hollow interior is sealed off while providing for liquid-venting communication;

immersing the part in an electrolytic bath while the interior of the hollow or concave portion as closed off remains in liquid venting communication with the exterior of that bath;

electrolytically depositing metal on at least some of the outer surface parts of said part to the extent not included in the closed off portion; and

removing the closure as well as the wall extension after completion of the depositing process.

4,708,779

CHEMICAL POST-TREATMENT OF SELECTIVELY GALVANIZED STEEL STRIP AND SHEET

Stavros G. Fountoulakis, Asbury, N.J.; Richard N. Steinbicker, Bethlehem, Pa.; Daniel E. Hruskoci, Michigan City, Ind., and Rajesh K. Singh, Bethlehem, Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Oct. 20, 1986, Ser. No. 920,635
Int. Cl.[4] C25D 5/48
U.S. Cl. 204—27 6 Claims

1. A method of treating a selectively zinc-coated steel strip to improve the appearance and paintability of the non-coated areas of said strip, comprising the steps of applying to such areas a solution of an aqueous bifluoride salt, and followed thereby by rinsing said areas with a caustic solution having a pH between 10 and 12.

4,708,780

PROCESS FOR THE ELECTROCARBOXYLATION OF CARBONYL COMPOUNDS, FOR PRODUCING α-HYDROXYCARBOXYLIC ACIDS

Giuseppe Silvestri; Salvatore Gambino, and Giuseppe Filardo, all of Palermo, Italy, assignors to Consiglio Nazionale Delle Ricerche, Rome, Italy

Filed Jan. 15, 1986, Ser. No. 819,295
Claims priority, application Italy, Jan. 21, 1985, 19168 A/85
Int. Cl.[4] C25B 3/00, 3/10
U.S. Cl. 204—59 R 9 Claims

1. An electrocarboxylation process for producing α-hydroxycarboxylic acids by inserting a carbon dioxide molecule into carbonyl compounds, characterized by using soluble metal anodes selected from the group consisting of aluminum, zinc, magnesium, copper and their alloys for electrolysis, conducting the electrolysis of the carbonyl compound in diaphragmless cells in the presence of a support electrolyte and an organic solvent into which carbon dioxide is bubbled, recovering a product by adding to the solution subjected to electrolysis a solvent which causes precipitation of the complex salt obtained by the electrolysis, and separating and hydrolyzing the product to obtain the required acid.

4,708,781

PROCESS OF SIMULTANEOUSLY PRINTING AND ELECTROFORMING CERAMIC ARTICLES

Henri V. Poorten, Mons, Belgium, assignor to Andromaque, S.A., Luxembourg, Luxembourg

Filed Oct. 20, 1986, Ser. No. 921,158
Claims priority, application Luxembourg, Oct. 18, 1985, 86128
Int. Cl.[4] C25D 13/00
U.S. Cl. 204—180.9 18 Claims

1. A process of printing ceramic articles simultaneously with electroforming them to produce ceramic articles having patterns thereon, said process comprising the steps of:

preparing a thin flexible diaphragm with a transfer pattern thereon,

applying said diaphragm to an electrode,

immersing said electrode with said diaphragm thereon in a ceramic slip,

applying electric current between said electrode and a counterelectrode with said electrode as an anode to deposit ceramic material on said diaphragm on said electrode to form a green ceramic article, the design of said diaphragm being imparted to said article,

removing said electrode with said diaphragm and said article thereon from said slip and removing said article and diaphragm together from said electrode, and

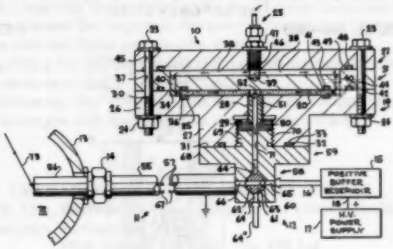
drying and firing said article with said pattern thereon.

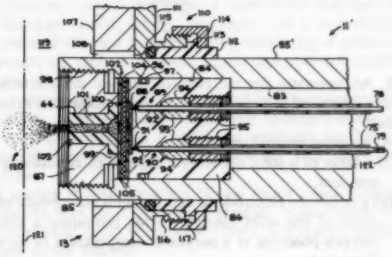
4,708,782

CHROMATOGRAPHY COLUMN-ELECTROPHORESIS SYSTEM

Brian D. Andresen, Pleasanton, and Vinit Saxena, Pinole, both of Calif., assignors to Sepragen Corporation, San Leandro, Calif.

Filed Sep. 15, 1986, Ser. No. 906,846
Int. Cl.[4] G01N 27/26, 30/72; B01D 15/08; H01J 49/00
U.S. Cl. 204—299 R 22 Claims





1. A system for separating fluid components and conditioning at least certain of the components for analysis or other use, comprising the combination of:

a horizontal flow liquid chromatography column;

a capillary type electrophoresis apparatus; and

means for interconnecting said column with said electrophoresis apparatus and controlling flow of fluid components from said column into said electrophoresis apparatus;

said column being removably mounted on said means such that associated fluid components separated in said column are controllably deposited directly into said electrophoresis apparatus, said column including disposable fluid separation material, and a fluid distribution and component collection system in which associated fluid to be separated is adapted to be directed around at least a portion of one of side of the fluid separation material and directed radially through the fluid separation material with separated fluid components being collected at an opposite side of the fluid separation material for discharge into said means;

said electrophoresis apparatus including at least one capillary tube operatively connected to said means, a reservoir for electrically conducting buffer material operationally connected to said means, and means for connecting a positive terminal of a high voltage source on buffer material contained in said reservoir;

said means including a multi-port valve assembly operationally connected to said component collection system of said column to said capillary tube and to said buffer material reservoir, for selectively directing associated fluid components and associated buffer material into said capillary tube.

4,708,783
APPARATUS FOR THE DETERMINATION OF SILICON IN MOLTEN METAL

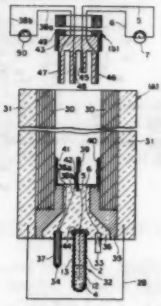
Hajime Nakamura, Hiroshima; Masanori Iwase; Eiji Ichise, both of Kyoto; Takaharu Moriya, Hiroshima, and Shigeaki Maruhashi, Tokyo, all of Japan, assignors to Nisshin Steel Co., Ltd., Tokyo, Japan

Division of Ser. No. 858,175, May 1, 1986, Pat. No. 4,657,641. This application Jan. 20, 1987, Ser. No. 4,403

Claims priority, application Japan, May 15, 1985, 60-101373

Int. Cl.[4] G01N *27/58*

U.S. Cl. 204—423 **5 Claims**



1. An apparatus for the electro-chemical determination of silicon dissolved in a molten metal which comprises in combination:

A. a silicon sensor comprising:

(i) a layer of a solid electrolyte capable of conducting oxygen ions,

(ii) a reference electrode in contact with one surface of said layer of the solid electrolyte for providing a constant oxygen potential at a particular temperature of measurement and

(iii) a solid auxiliary electrode comprising SiO_2 disposed in the immediate vicinity of the other surface of said layer of the solid electrolyte.

B. a metallic electrode,

C. a thermocouple for measuring the temperature of the molten metal,

D. a protecting cap enveloping said silicon sensor, metallic electrode and thermocouple, for protecting them upon their immersion in the molten metal, said cap being composed of a consumable material which is dissolved in the molten metal immediately after the immersion in the molten metal without substantially changing the composition of the molten metal so that said silicon sensor, metallic electrode and thermocouple may be exposed to the molten metal, and

E. a means for determining a potential difference between said reference electrode and metallic electrode exposed to the molten metal.

4,708,784
HYDROVISBREAKING OF OILS

Jerald A. Howell, and Simon G. Kukes, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 917,746, Oct. 10, 1986, abandoned. This application Feb. 25, 1987, Ser. No. 18,690

Int. Cl.[4] C10G *45/04*

U.S. Cl. 208—112 **34 Claims**

1. A hydrotreating process comprising the step of contacting

(A) a substantially liquid hydrocarbon-containing feed stream, which also contains Ramsbottom carbon residue, as determined by ASTM D524, in excess of about 0.1 weight-%, simultaneously with

(B) a free hydrogen-containing gas, and

(C) a catalyst composition comprising a mixture of at least one alkyl molybdate and at least one molybdenum sulfonate,

under such hydrotreating conditions as to obtain a liquid product having reduced amounts of Ramsbottom carbon residue and reduced amounts of hydrocarbons boiling in excess of 1000° F. at atmospheric pressure.

4,708,785
CARBO-METALLIC OIL CONVERSION

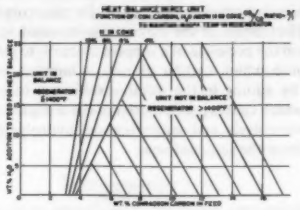
George D. Myers, deceased, late of Ashland, Ky. (by Virginia K. Myers, administratrix), assignor to Ashland Oil, Inc., Ashland, Ky.

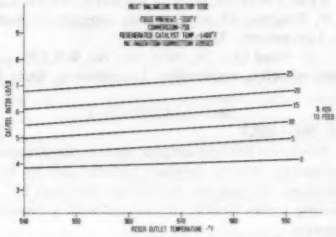
Continuation-in-part of Ser. No. 485,574, Apr. 1, 1983, Pat. No. 4,602,993, which is a continuation-in-part of Ser. No. 306,813, Sep. 29, 1982, Pat. No. 4,390,415, which is a division of Ser. No. 94,092, Nov. 14, 1979, Pat. No. 4,332,673. This application Mar. 20, 1985, Ser. No. 694,719

The portion of the term of this patent subsequent to Nov. 10, 1998, has been disclaimed.

Int. Cl.[4] C10G *11/18*

U.S. Cl. 208—113 **16 Claims**





13. A method for catalytically cracking reduced crude oil feeds comprising Conradson carbon in the presence of a premised catalyst temperature of about 760° C. (1400° F.), said cracking being carried out to form hydrocarbon products comprising gasoline, which method comprises maintaining the functions of oil feed, Conradson carbon, hydrogen in deposited carbonaceous material, and water addition to the oil feed to be converted in accordance with the relationship of operating parameters identified in FIGS. 6 and 9 for a catalyst to oil ratio in the range of about 4.5 to 7.5.

4,708,786
PROCESS FOR THE CATALYTIC CRACKING OF NITROGEN-CONTAINING FEEDSTOCKS

Mario L. Occelli, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Mar. 26, 1986, Ser. No. 844,136
Int. Cl.[4] C10G *11/18, 29/16*
U.S. Cl. 208—120 **44 Claims**

1. A process for the catalytic cracking of a hydrocarbon feedstock containing nitrogen compounds in an amount such that said feedstock contains greater than about 0.08 weight percent total nitrogen, calculated as the element, which process comprises contacting said feedstock in the vapor phase, without first treating said feedstock to remove at least a portion of said nitrogen compounds, with a mixture of a regenerated cracking catalyst and separate particles of a nitrogen scavenger under cracking conditions in the substantial absence of added molecular hydrogen in a cracking zone to convert components of said feedstock into lower molecular weight constituents, wherein said regenerated cracking catalyst comprises a zeolitic molecular sieve having cracking activity dispersed in a matrix and said nitrogen scavenger comprises a nonzeolitic molecular sieve or a heat stable metal compound selected from the group consisting of magnesium, calcium, zirconium, boron, phosphorus and tungsten compounds, and wherein the concentration of metals in said hydrocarbon feedstock is such that the following relationship exists

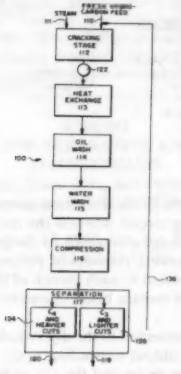
$$10[Ni]+[V]+[Fe] \text{ is less than about } 8.0$$

where [Ni], [V] and [Fe] are the concentrations of nickel, vanadium and iron, respectively, in parts per million by weight.

4,708,787
METHOD FOR SUPPLYING A UNIFORM LIQUID AND GASEOUS MIXTURE

Albert W. Peters, Alvin, Tex., and Gregory J. MacCallum, Marlboro, Mass., assignors to Amoco Corporation, Chicago, Ill.

Filed Apr. 14, 1986, Ser. No. 851,530
Int. Cl.[4] C10G *9/16*
U.S. Cl. 208—130 **2 Claims**



1. A method for thermally cracking a feed comprising at least one hydrocaron selected from the group consisting of paraffins containing up to 10 carbon atoms, naphthas, gas oils and mixtures thereof to produce hydrogen, methane, olefins, naphthenes, and aromatics, comprising:

cracking said feed at high temperature in a reactor inthe presence of steam;

fractionating an effluent from said reactor;

fractionating the resulting C3 fraction in successive fractionating stages to obtain a fraction which substantially consists of molecules having a single carbon atom, such as carbon monoxide and methane, and hydrogen atoms in a nonuniform liquid and gaseous mixture where the liquid component is mainly methane;

separating the nonuniform liquid and gaseous mixture into a liquid component and a gaseous component;

accelerating the flow rate of the gaseous component to a high velocity;

dispersing the liquid component into the gaseous component by injecting fine droplets of the liquid component into the maximum flow region of the gaseous component to obtain a uniform liquid and gaseous component;

supplying the uniform liquid and gaseous mixture to a heat exchanger; and

partitioning the effluent from the heat exchanger into a hydrogen rich fraction and a methane rich fraction.

4,708,788
UPGRADING CARBONACEOUS MATERIALS

Jim Y. Low, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 16, 1984, Ser. No. 631,366
Int. Cl.[4] C10G *1/06, 47/00, 47/02*
U.S. Cl. 208—390 **12 Claims**

1. A process comprising

(a) forming a reaction mixture of liquid phase hydrogenated hydrogen-donor solvent, hydrogen and a carbonaceous material selected from the grou › consisting of petroleum residuum, asphalt, tar sand, lignite and coal in a liquefaction zone;

(b) maintaining a vapor phase in said liquefaction zone containing hydrogen, dehydrogenated hydrogen-donor solvent, and upgraded liquefaction products so that said reaction mixture reaches equilibrium with said vapor phase;

(c) passing at least a portion of said vapor phase from said liquefaction zone through a separate regeneration zone maintained under conditions to form hydrogenated hdyrogen donor solvent;

(d) condensing hydrogenated hdyrogen-donor solvent produced in said regeneration zone to provide condensed hydrogenated hydrogen-donor solvent;

(e) introducing into said reaction mixture at least a portion of said condensed hydrogenated hydrogen-donor solvent and

(f) withdrawing upgraded liquid product from the liquefaction zone.

4,708,789
MOBILE MINERAL PREPARATION PLANT

Bernie F. Cox, Mansfield, Ohio, assignor to Mineral Preparation, Inc., Mansfield, Ohio

Filed Jun. 27, 1986, Ser. No. 879,445
Int. Cl.[4] B03B *5/14*
U.S. Cl. 209—457 **10 Claims**

1. Apparatus for separating granular material composed of particles of different specific gravity, comprising:

a frame defining a receiving chute and a discharge chute;

at least four water-containing hydraulic separation cells serially supported on said frame and including an upstream cell operatively associated with said receiving chute and a downstream cell operatively associated with said discharge chute, each cell including:

a wave chamber with a horizontal screen located below the water surface and adapted to support submerged granular material in a slurry;

a refuse bin separated from said wave chamber for receiving refuse in the form of particles of relatively high specific gravity;

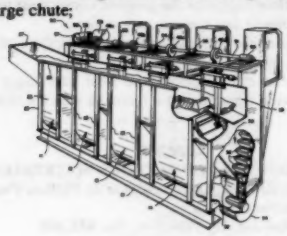
means for removing refuse from said bin; and

plunger means for cyclically raising and lowering the

water level in said wave chamber to cause horizontal separation of particles of different specific gravity, the stroke of the plunger means for each cell being of progressively decreasing magnitude from said upstream cell to said downstream cell;

each plunger means being in opposite phase with any adjacent plunger means so that when the water level in one wave chamber is at its highest level, the water level in any adjacent wave chamber is at its lowest level;

said wave chambers of said cells defining a slurry-filled flow channel extending from said receiving chute to said discharge chute;



whereby said plunger means for said cells generate an oscillating wave that progresses along said flow channel and that has at least two full wave cycles produced therin from said upstream cell to said downstream cell, said wave being reinforced by the plunger means for each successive cell and having a controlled decreasing amplitude from the upstream end to the downstream end of said flow channel so that the wave oscillations at the terminal end of the flow channel are sufficiently small to enable a fine discrimination between a lighter material to be conveyed to the discharge chute and a material relatively close in specific gravity to the lighter material, to be separated from the lighter material.

4,708,790

ULTRAFILTRATION SYSTEM WITH REGENERATION CONTROL

James W. Bray, West Chester, Ohio, assignor to Champion International Corporation, Stamford, Conn.

Continuation of Ser. No. 616,912, Jun. 4, 1984, abandoned. This application Aug. 1, 1986, Ser. No. 892,896

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—87 **8 Claims**

1. An ultrafiltration system comprising:

a plurality of filter modules coupled in a parallel arrangement to a liquid input conduit and a permeate output conduit;

means for detecting the permeate flow rate or pressure at the output of each filter module;

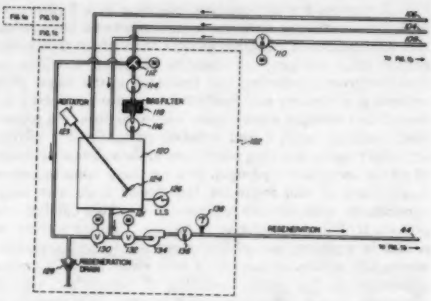
means responsive to said detecting means for generating a regeneration signal for a filter module if the permeate flow rate or pressure at the output of such filter module falls below a threshold value;

valve means for disconnecting a filter module from said parallel arrangement and coupling it into a filter regeneration circuit in response to a regeneration signal which has been generated for that filter module;

means for automatically regenerating a filter module coupled into said filter regeneration circuit;

means for recoupling a regenerated filter module into said parallel arrangement after it has been regenerated;

controller means for storing any regeneration signals, indicative of additional filter modules in need of regeneration, which are generated while said regeneration circuit is in use and for supervising the selection of said filter modules



to be regenerated and sequence of their regeneration as based on the order of receipt of said regeneration signals; and

means for subsequently sequentially regenerating any such additional filter modules in response to stored regeneration signals.

4,708,791

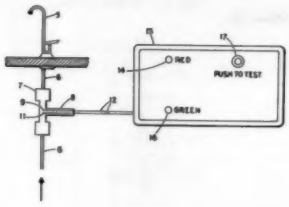
WATER QUALITY MONITOR

John A.B. Dillard, III Ojai, Calif., assignor to PJD Associates Inc., Santa Barbara, Calif.

Filed Dec. 4, 1986, Ser. No. 938,060

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—96.2 **4 Claims**



1. The combination of an ionization potential probe and a qualitative indicating circuit wherein the circuit includes:

(a) a source of voltage connected to the probe;

(b) a dip switch having resistors of progressive quantity of resistance connected to each switch of the dip switch and each switch and resistor being connected to the source of voltage;

(c) an amplifier connected to the dip switch and to the probe and having an output depending upon the difference in voltage between probe and the dip switch;

(d) a flip-flop connected to the amplifier output and having two outputs;

(e) a first indicator connected to one output of the flip-flop;

(f) a second indicator connected to the other output of the flip-flop,

whereby a large current flow at the probe produces a voltage different from a selected dip switch voltage to activate an indicator to indicate excessive dissolved inorganic solids and a small difference voltage activates the other indicator for an acceptable level of dissolved solids.

4,708,792

FILTER MEDIUM

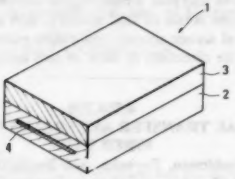
Takashi Takarabe, 68-2, 2-chome, Mutsugawa, Minami-ku, Kanagawa-ken, and Yoshihiko Ueda, 1-13, 3 chome, Sakurabatake, Yamaguchi-shi, Yamaguchi-ken, both of Japan, assignors to Takara Kogyo Co., Ltd., Tokyo; Takashi Takarabe, Kanagawa and Yoshihiko Ueda, Yamaguchi, all of, Japan

Filed Apr. 21, 1986, Ser. No. 854,413

Claims priority, application Japan, Oct. 17, 1985, 60-229914; Oct. 17, 1985, 60-229915; Oct. 17, 1985, 60-229916; Oct. 17, 1985, 60-229917

Int. Cl.[4] C02F *3/04*

U.S. Cl. 210—150 5 Claims



1. A combined filter medium comprising a first fibrous filter medium having relatively large voids and a relatively high porosity, and further having a fluid passage formed therein, and a second fibrous filter medium having voids smaller than those of said first filter medium and a porosity lower than that of said first filter medium, said first and second filter mediums being formed of fibrous material of a diameter from 0.01 to 3 mm and having a water-resistant property, and said second filter medium being capable of generating a pressure loss which is at least 1.4 times as large as the pressure loss generated in the first filter medium with respect to an identical water flow amount per unit length, said combined filter medium filtering raw water by receiving a main flow of the raw water in said fluid passage, flowing the main flow through said first filter medium because of a difference in pressure loss between said first and second filter mediums, thus forming branch flows of water, and flowing the branch flows through said second filter medium, and wherein said first filter medium supplies oxygen to said second filter medium in which aerobic microorganisms breed, whereby trapped organic material is decomposed by the microorganisms.

4,708,793

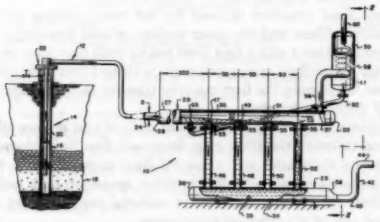
SYSTEM FOR SEPARATING GAS-LIQUID FLOWSTREAMS

Richard L. Cathriner, Plano, Tex., and Thomas R. Roose, Downers Grove, Ill., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jun. 13, 1986, Ser. No. 874,258

Int. Cl.[4] B01D *19/00*

U.S. Cl. 210—188 10 Claims



1. A system for separating liquid and gas in two-phase flow in a closed conduit wherein slugs of one fluid are entrained in a flow stream which is a fluid of another phase, said system comprising: means for converting slug flow into channel flow in a closed system including,

a first elongated closed vessel forming an inlet manifold and having an inlet conduit for receiving two-phase fluid flow comprising slugs of fluid of one phase in a fluid of another phase, said manifold having an inlet portion with a cross-sectional flow area sufficient to reform slug flow of fluid from said inlet conduit into a channel flow condition in a chamber formed in said inlet manifold to provide a substantially unobstructed channel forming a liquid flow space along a lower portion of said inlet manifold and a gas flow space;

a second elongated closed vessel forming a liquid discharge manifold disposed spaced apart from said inlet manifold and spaced vertically below said inlet manifold and connected to a liquid discharge conduit;

a plurality of generally vertically extending downcomer conduits interconnecting said inlet manifold and said discharge manifold, said downcomer conduits being spaced apart one from the other along the liquid flow space of said inlet manifold and opening to said manifolds, respectively, for conducting liquid flow from said inlet manifold to said discharge manifold, said downcomer conduits opening into said inlet manifold along said lower portion thereof to direct the channel flow of liquid flowing through said inlet manifold into said downcomer conduits, said downcomer conduits being sufficient in number such that at a predetermined flow rate of fluid through said inlet manifold that substantially entirely liquid flow is conducted through a majority of said downcomer conduits to said discharge manifold; and

a gas discharge conduit opening into said chamber of said inlet manifold for removing gas from said inlet manifold separated from said flow stream.

4,708,794

INSTALLATION AND APPARATUS FOR TREATING A LIQUID, IN PARTICULAR FOR DEMINERALIZING WATER PASSING THROUGH A BED OF ACTIVE GRANULAR MATERIAL WHICH IS COMPACTED IN A HIGH POSITION AND WHICH IS PERIODICALLY REGENERATED BY A REVERSE FLOW

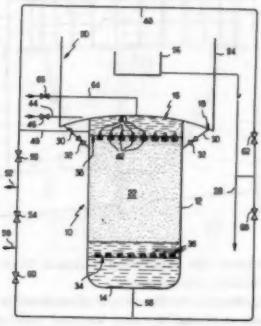
Alain Deguin, Paris, France, assignor to Societe Amenagement Urbain et Rural S.A., Paris, France

Filed May 1, 1985, Ser. No. 729,271

Claims priority, application France, May 3, 1984, 84 106881

Int. Cl.[4] B01J *49/00*

U.S. Cl. 210—189 14 Claims



1. A installation for treating and in particular for demineralizing liquid by passing the liquid through a bed of granular material capable of being regenerated by backflow of a regen-

erator liquid through the bed in the opposite direction to the flow of liquid during treatment, the bed being maintained in the compacted state throughout treatment, the installation comprising:

a treatment volume constituted by a first vertical cylindrical barrel closed at the bottom by a curved end plate and at the top by a curved end plate which is upwardly convex;

granular material disposed in said treatment volume in use;

an expansion volume for the bed constituted by a second vertical cylindrical barrel coaxially disposed above said treatment volume, said second barrel having a downwardly concave curved bottom plate which is common with the top of the treatment volume and which is of greater diameter than the diameter of the first cylindrical barrel, the top of the said second barrel remaining open to the atmosphere and being equipped with an overflow device;

means for putting the treatment and expansion volumes into communication with each other and for isolating them from each other, to periodically enable the granular material to be transferred therebetween, thereby uncompacting the bed;

means for periodically circulating the liquid to be treated, a regenerator solution, and also a rinsing liquid, said periodic circulating means comprising:

means for periodically uncompacting the bed by passing a portion of the granular bed material into the expansion volume by means of a rising flow of liquid after the two volumes have been put into communication with each other and thereafter returning all of the granular bed material into the treatment volume;

means for compacting the bed in a high position in the treatment volume by means of a rising current of liquid, whereby rapid rinsing of the bed is performed in this high position; and

means for treating the liquid to be treated by means of a rising flow of said liquid through the bed which is held in the compacted state in the high position.

4,708,795

SCREENING DEVICE

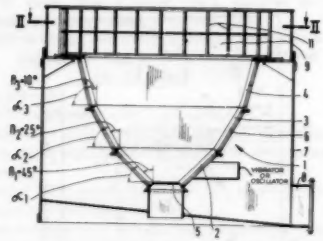
Gerhard Schmidt, Ettlingen; Christian Neukam, Karlsruhe, and Heinrich Schmidt, Düsseldorf, all of Fed. Rep. of Germany, assignors to Hein, Lehmann AG, Dusseldorf, Fed. Rep. of Germany

Filed May 2, 1986, Ser. No. 859,131

Claims priority, application Fed. Rep. of Germany, May 3, 1985, 3515891

Int. Cl.[4] B07B *1/00*

U.S. Cl. 210—304 **10 Claims**



1. An apparatus for separating a liquid from a solid of a solid-liquid mixture, comprising:

a separating screen in the shape of at least one surface of revolution centered upon a vertical axis and having a diameter at an upper end of said screen which is greater than a diameter of said screen at a lower end thereof, the diameter of said screen progressively decreasing from said upper end to said lower end;

means forming a solids-discharge opening at said lower end of said screen;

means surrounding said screen for collecting said liquid upon traversal of said screen by said liquid;

a mixture-inlet region formed by a spiral screen section at an upper end of said separating screen having an inlet location at which said spiral screen section has its largest radius, said spiral screen section decreasing progressively in radius away from said location; and

means for optimizing the separation effect in the inlet region of said screens including means for tangentially feeding said mixture onto said mixture-inlet region at said location so that said mixture flows around said region at high velocity and then onto said separating screen to cause liquid of said mixture to pass through sieve openings in said screen and said screen region thereby separating said liquid from solids of said mixture, said sieve openings of said spiral screen section being slots extending perpendicular to the direction of flow of said mixture therealong.

4,708,796

MATERIAL TRANSFER APPARATUS OF HOLLOW FIBER TYPE

Masayuki Yoshimoto, Toyoake, and Toshiaki Takagi, Fujinomiya, both of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 27, 1985, Ser. No. 781,138

Claims priority, application Japan, Sep. 29, 1984, 59-148205[U]

Int. Cl.[4] B01D *13/01*

U.S. Cl. 210—321.8 **9 Claims**

1. A material transfer apparatus of hollow fiber type for transferring a certain material between first and second fluids, comprising

a tubular housing,

a bundle of a plurality of hollow fiber membranes axially extending through the housing and allowing the material to migrate thereacross,

a first fluid chamber defined by the outer surface of said hollow fibers and the inner surface of said housing,

a first fluid inlet and a first fluid outlet both provided on the housing in fluid communication with said first fluid chamber for passing the first material transfer fluid into and out of the first chamber,

partitions supporting the opposite ends of said hollow fibers and isolating the fiber ends from said first fluid chamber,

a second fluid inlet and a second fluid outlet both in fluid communication with the interior space of said hollow fibers for passing the second material transfer fluid into and out of the fiber interior space,

a first flowpath forming member having the second fluid inlet mounted on one end of the housing,

a second flowpath forming member having the second fluid outlet mounted on the other end of the housing, and

an elastomeric annular member integrally molded to each said flowpath forming member on its inner surface, wherein the elastomeric member is secured in pressure contact to the partition by the flowpath forming member to provide a fluid-tight seal between the partition and the flowpath forming member.

4,708,797

ROTARY DISC FILTER ELEMENT

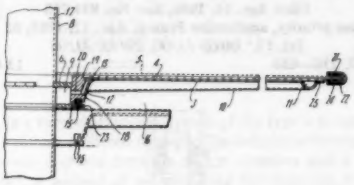
Rolf Baur, Heubach-Lautern, and Bernhard Gruber, Waldstetten, both of Fed. Rep. of Germany, assignors to Anton Steinecker Maschinenfabrick GmbH, Fed. Rep. of Germany

Filed Jul. 1, 1983, Ser. No. 510,417

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1982, 3232354

Int. Cl.[4] B01D *33/24*

U.S. Cl. 210—330 **12 Claims**



1. In a rotary disc filter assembly for a tank having an elongate, upright shaft extending therethrough and a plurality of rotary disc filter elements arranged in vertically stacked relation on said shaft, each of said filter elements having a circular bottom plate, a hub fixed to said bottom plate at its center, a supporting mesh carried by and overlying said bottom plate, a filter mesh overlying said supporting mesh, and means clamping said meshes to said bottom plate at the periphery thereof, the improvement wherein said bottom plate is unsupported radially outwardly of its hub and is downwardly deformed to provide therein a plurality of radially extending, circumferentially spaced grooves inclined downwardly and radially inwardly, the hub of each of said filter elements having an axial length sufficiently greater than the axial depth of any of said grooves whereby, when said filter elements are in stacked relation on said shaft and the hubs of adjacent filter elements are in engagement, a radially unobstructed axial space exists between the filter mesh of each filter element and the adjacent upper filter element.

4,708,798

ENDLESS BELT BATCH FILTRATION APPARATUS

Henri G. W. Pierson, Tenerife, Spain, assignor to D and C Ltd., Monrovia, Liberia

Filed May 5, 1986, Ser. No. 859,830

Claims priority, application United Kingdom, May 9, 1985, 8511761; Mar. 7, 1986, 8605702

Int. Cl.[4] B01D *29/02, 33/04*

U.S. Cl. 210—385 **11 Claims**

1. Batch filtration apparatus, comprising:

(a) a drainage plate disposed substantially horizontally and having a pair of inclined sidewalls disposed along opposing longitudinal sides of said plate;

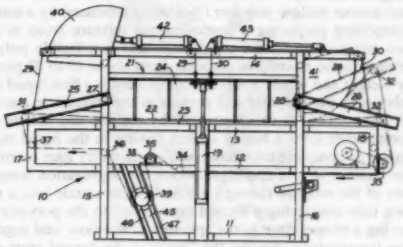
(b) vacuum means connected to said drainage plate selectively applying vacuum pressure to said drainage plate to draw liquid downwardly therethrough;

(c) an endless filter belt having an upper run above and along the length of said drainage plate, and a lower run below said drainage plate;

(d) means for supporting said endless filter belt in its upper and lower runs;

(e) means for driving said endless filter belt around said means for supporting when vacuum is not applied to said drainage plate;

(f) guide means for shaping said endless filter belt in its upper run; and



(g) means for selectively moving said guide means between a first position in which said belt is driven, and prior to application of vacuum a second position in which said belt in its upper run and inclined sidewalls form a trough-shaped receptacle for a batch of material to be filtered.

4,708,799

HOLLOW FIBER MEMBRANE FOR PLASMA SEPARATION

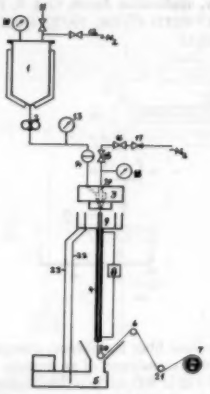
Klaus Gerlach, Friedenstr. 30, 8750 Aschaffenburg-Obernau; Erich Kessler, Breubergweg 33, 6128 Hoechst, and Werner Henne, Winterbergstr. 46, Wuppertal, all of Fed. Rep. of Germany

Continuation of Ser. No. 601,259, Apr. 17, 1984, abandoned, which is a continuation of Ser. No. 296,187, Aug. 25, 1981, abandoned, which is a continuation-in-part of Ser. No. 283,673, Jul. 15, 1981, abandoned. This application Sep. 17, 1985, Ser. No. 777,844

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1980, 3026718

Int. Cl.[4] B01D *39/00*; D02G *3/00*

U.S. Cl. 210—500.23 **32 Claims**



1. A hollow fiber membrane for plasma separation comprising a porous hollow polymer fiber defining a volume part of at least 70% by volume pores, said porous hollow polymer fiber displaying an inner fiber diameter from about 100 to 550 micron and a wall thickness from about 15 to 300 micron and being a polymer selected from the group consisting of a poly-

olefin, a copolymer polyolefin, a halogen containing polyolefin and polyethylene sulfide, said volume part displaying a filtration factor for separation of marcomolecules from biological cells in a liquid mixture containing both, said filtration factor for proteins of human blood, being in the molecular weight range of from about 60,000 to 3,000,000, of at least about 0.7, said porous hollow polymer fiber being produced by a method comprising preparing a homogeneous mixture from at least two components where one component is a fusible polymer present in the mixture in amounts from about 10 to 30 percent by weight and where a solvent component is a first liquid inert relative to the polymer and present in the mixture in amounts of from about 70 to 90 percent by weight and where said components form a binary system having in the liquid state a region of complete miscibility and a miscibility gap; extruding the mixture at a temperature above the segregation temperature of the mixture through a hollow fiber nozzle into a spinning tube containing a second liquid inert to the polymer and having a temperature in the spinning tube below said segregation temperature; moving the fiber and the second inert spinning liquid in the same direction and with about the same or only slightly different linear speed through the spinning tube; and removing the fiber under low tension from the spinning tube.

23. A hollow fiber membrane for plasma separation comprising a porous hollow polymer fiber defining a volume part of at least 70% by volume pores, said porous hollow polymer fiber displaying an inner fiber diameter from about 100 to 550 micron and a wall thickness from about 15 to 300 micron and being a polymer selected from the group consisting of a polyolefin, a halogen containing polyolefin and polyethylene sulfide, said volume part displaying a filtration factor for separation of macromolecules from biological cells in a liquid mixture containing both, said filtration factor for proteins of human blood, in the molecular weight range of from about 60,000 to 3,000,000, of at least about 0.7.

4,708,800

HOLLOW FIBER MEMBRANE AND METHOD FOR MANUFACTURE THEREOF

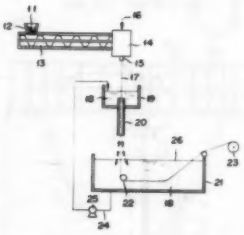
Toshiji Ichikawa, Chofu; Kazuaki Takahara, Tokyo; Kazuhiro Shimoda; Yukio Seita, both of Fuji, and Makoto Emi, Fujinomiya, all of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 1, 1985, Ser. No. 782,523

Claims priority, application Japan, Oct. 9, 1984, 59-210466

Int. Cl.[4] B01D *47/100, 59/10;* **D02G** *3/00*

U.S. Cl. 210—500.23 **13 Claims**



1. A porous hollow fiber membrane, comprising a polypropylene hollow fiber membrane of an annular cross section of substantial circle 150 to 300 μm in inside diameter and 10 to 150 μm in wall thickness made of polypropylene containing a crystal seed forming agent and having a high degree of crystallization, said hollow fiber membrane having an anisotropic structure that has on the inner wall side thereof a tight layer of intimately bound fine polypropylene particles and fine pores, and on the outer wall side thereof, a porous texture layer of fine polypropylene particles bound in chains and fine pores, the pores of said tight layer and said texture layer communicating with each other to form fine pores extending continuously from said inner wall side to said outer wall side.

4,708,801

METHOD AND DEVICE FOR FILTERING A SUSPENSION OF PARTICLES IN A LIQUID

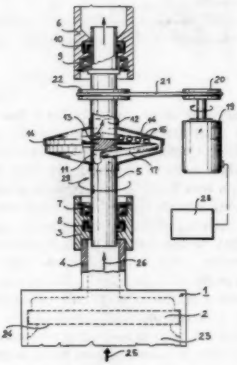
Stanislas Galaj, Arcueil, France, assignor to Compagnie Generale d'Electricite, Paris, France

Filed Apr. 14, 1986, Ser. No. 851,750

Claims priority, application France, Apr. 12, 1985, 85 05544

Int. Cl.[4] B01D *13/00, 29/38, 33/06*

U.S. Cl. 210—636 **12 Claims**



1. Method for filtering a suspension of particles in a liquid, the method comprising:

the liquid of the suspension disposed on a first side of a porous membrane is passed continuously through the membrane so as to obtain a flow of filtered liquid on the second side of the membrane, particles from the suspension then collecting in an undesirable manner on the first side of the membrane and clogging its pores,

and the filtered liquid is caused to flow at least once and momentarily towards the membrane in the opposite direction to the aforementioned flow so as to return to the suspension the particles collected on the first side of the membrane during the aforementioned passage of the liquid therethrough, and in which method the temporary return flow of the liquid is obtained:

by feeding the flow of filtered liquid into one end of a conduit which is wound around an axis and recovering the filtered liquid at the other end of the conduit, said one end of said conduit being in fluid communication with the second side of said membrane,

by progressively rotating the conduit about the axis in the direction opposite to the direction of flow of the filtered liquid relative to the conduit until the rotation speed of the conduit attains a predetermined constant value greater than the speed of the filtered liquid relative to the conduit, and by suddenly stopping rotation of the conduit.

4,708,802

APPARATUS FOR HEMODIAFILTRATION

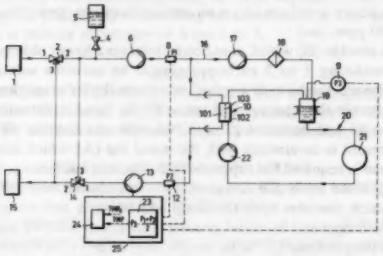
Dieter Rath, Melsungen, and Rolf Heitmeier, Baunatal, both of Fed. Rep. of Germany, assignors to Intermedicat GmbH, Emmenbrucke, Fed. Rep. of Germany

Filed Aug. 18, 1986, Ser. No. 897,704

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1985, 3529973

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—641 **16 Claims**



16. In a hemodiafiltration system of the type wherein blood from a patient is filtered through a hemodiafilter having a filter membrane disposed between a first chamber and a second chamber, a method of compensating for fluid loss from the second chamber during hemodiafiltration comprising the steps of:

directing fluid from a fluid source to the first chamber through a first conduit,

removing fluid from the first chamber at a rate such that the pressure across the filter membrane of the hemodiafilter remains constant,

directing fluid from the second chamber to the patient through a second conduit,

diverting fluid from the first conduit to the second conduit,

whereby fluid lost from the second chamber during hemodiafiltration is replaced in substantially equal quantity by fluid diverted from the first conduit to the second conduit.

4,708,803

LIQUID FILTRATION USING HYDROPHILIC CATIONIC ISOTROPIC MICROPOROUS NYLON MEMBRANE

Eugene A. Ostreicher, Farmington; Rodney A. Knight, New Milford; Joseph V. Fiore, Fairfield; George T. Emond, Southington, all of Conn., and Kenneth C. Hou, San Antonio, Tex., assignors to Cuno Incorporated, Meriden, Conn.

Continuation of Ser. No. 314,307, Oct. 23, 1981, Pat. No. 4,473,474, which is a continuation-in-part of Ser. No. 201,366, Oct. 27, 1980, abandoned. This application Sep. 6, 1984, Ser. No. 648,401

The portion of the term of this patent subsequent to Sep. 25, 2001, has been disclaimed.

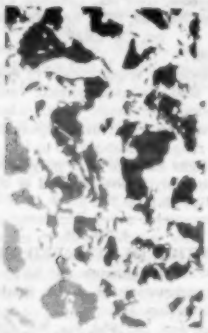
Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—650 **11 Claims**

1. A process for the filtration of particulates from a liquid comprising passing the liquid through a hydrophilic, cationic charge modified microporous filter membrane comprising:

a substantially isotropic, porous, hydrophilic, microporous cast nylon film membrane having a microstructure throughout said membrane; and

a polyamido-polyamine epichlorohydrin cationic charge modifying agent having tertiary amine or quaternary ammonium groups, said agent being bonded to substantially all of said membrane microstructure without substantial pore size reduction or pore blockage,



whereby the particulates are removed from the liquid by retention by the cationic charge modified membrane.

4,708,804

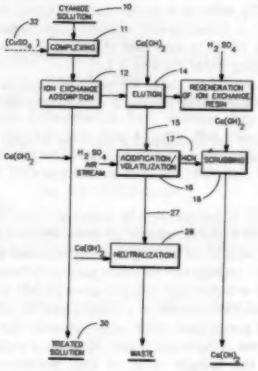
METHOD FOR RECOVERY OF CYANIDE FROM WASTE STREAMS

Enzo L. Coltrinari, Golden, Colo., assignor to Resource Technology Associates, Boulder, Colo.

Filed Jun. 28, 1985, Ser. No. 750,419

Int. Cl.[4] C02F *1/42*

U.S. Cl. 210—677 **26 Claims**



1. A method of treating waste streams containing free cyanide and cyanide complexes comprising:

concentrating cyanide complexes using weak base ion exchange resin;

eluting the resin with a recycled saturated lime solution to form an eluate having a concentration of cyanide higher than said waste stream;

recovering the cyanide from said eluate by acidification followed by volatilization.

4,708,805

BARIUM SULFATE REMOVAL AND ANTI-DEPOSITION COMPOSITIONS AND PROCESS OF USE THEREFOR

Thomas F. D'Muhala, Geer Rd., Lebanon, Conn. 06249

Filed Nov. 24, 1986, Ser. No. 934,604
Int. Cl.[4] C02F 5/12
U.S. Cl. 210—698 11 Claims

1. A composition for sequestration of barium sulfate comprising citric acid, a polycarbazic acid, and an alkylenepolyaminopolycarboxylic acid, wherein the weight ratio of said citric acid to said alkylenepolyaminopolycarboxylic acid is in the range from about 0.5 to 1 to about 11 to 1, and wherein the weight ratio of said polycarbazic acid to said alkylenepolyaminopolycarboxylic acid is in the range from about 0.002 to 1 to about 0.2 to 1.

4,708,806

DESTRUCTION OF NITRATED AROMATICS

Richard E. Bockrath, Wilmington, and Kirby Kirksey, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 29, 1984, Ser. No. 625,908
Int. Cl.[4] C02F 1/72, 1/76
U.S. Cl. 210—754 6 Claims

1. A process for destroying nitrated aromatics by breaking the ring structure comprising treating at 0° to 100° C. for 2 to 60 hours an aqueous solution containing 0.5 to 10 percent by weight of said nitrated organics with 0.2 to 7 molecular equivalents, based on organic nitro group, of finely divided iron particles while maintaining the pH of the solution at 1.5 to 3 through addition of hydrochloric acid or a mixture of hydrochloric acid and ferric chloride.

4,708,807

CLEANING AND WATERPROOFING COMPOSITION

Beverly K. Kemerer, Saginaw Township, Saginaw County, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Apr. 30, 1986, Ser. No. 857,659
Int. Cl.[4] D06M 1/00
U.S. Cl. 252—8.6 29 Claims

1. A cleaning and waterproofing composition, comprising:

(a) from about 1.5 to about 4.5 parts by weight of a siloxane resin selected from the group consisting of a silanol-functional copolymer consisting essentially of SiO_2 units and $(CH_3)_3SiO_{\frac{1}{2}}$ units in a molar ratio ranging from 1:0.4 to 1:1.2 and a trimethysilyl-capped copolymer consisting essentially of SiO_2 units and $(CH_3)_3SiO_{\frac{1}{2}}$ units in a molar ratio ranging from 1:0.4 to 1:1.2;

(b) from about 1.5 to about 4.5 parts by weight of a polydimethylsiloxane fluid having a viscosity from 5 to 100,000 cS at 25° C.;

(c) from about 1.0 to about 3.0 parts by weight of a titanate ester represented by the formula

$$Ti(OR)_4$$

wherein R is independently selected from alkyl radicals having 3 to 8 carbon atoms; (d) from about 0.5 to about 3.0 parts by weight of a polydimethylsiloxane-polyoxyalkylene block copolymer wherein said polydimethylsiloxane block has a molecular weight from 10,000 to 50,000, said polyoxyalkylene block is a copolymer of ethylene oxide units and propylene oxide units wherein the polypropylene content is between 0 and 50% on a molar basis, and wherein the weight ratio of said polydimethylsiloxane block to said polyoxyalkylene block is between 2 and 8;

(e) up to about 95.5 parts by weight of at least one cyclicdimethyl siloxane selected from the group consisting of octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane and dodecamethylcyclohexasiloxane; and

(f) up to about 95.5 parts by weight of at least one solvent selected from the group consisting of petroleum hydrocarbons, chlorinated hydrocarbons and aromatic hydrocarbons, said solvent being present in such amount that the sum of components (a) through (f) in the composition is 100 parts.

4,708,808

SYNERGISTIC ANTIMICROBIAL OR BIOCIDAL MIXTURES

Harold W. Rossmoore, Oak Park, Mich., assignor to The Board of Governors of Wayne State University, Detroit, Mich.

Division of Ser. No. 728,793, Apr. 30, 1985, Pat. No. 4,666,616.
This application Mar. 20, 1987, Ser. No. 28,460
Int. Cl.[4] C10M 129/00, 139/00
U.S. Cl. 252—11 11 Claims

1. A concentrated composition which comprises in admixture:

(a) a heavy metal ion (A) in an amount between about 50 and 250 ppm; and

(b) a biocide (B) which contains or releases a lower aldehyde containing 1 to 5 carbon atoms in an aqueous solution wherein the biocide is tris-(hydroxymethyl)nitromethane, wherein the heavy metal ion with the biocide is toxic to fungal and bacterial growth, wherein the biocide (B) is present in an amount with the metal ion (A) which is less than is required for suppressing fungal and bacterial activity alone when the composition is introduced into a fluid which contains both the fungi and bacteria and wherein the fungal and bacterial growth is suppressed for 72 hours in the presence of 1% by weight iron chips in the solution.

4,708,809

TWO-CYCLE ENGINE OILS CONTAINING ALKYL PHENOLS

Kirk E. Davis, Euclid, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed Jun. 7, 1982, Ser. No. 385,990
Int. Cl.[4] C10M 135/10
U.S. Cl. 252—33.4 26 Claims

1. A lubricant composition for two-cycle engines comprising a major amount by weight of at least one oil of lubricating viscosity and a minor amount, sufficient to control piston ring sticking and promote general engine cleanliness, of

(A) at least one phenolic compound of the formula

$$(R)_a—Ar—(OH)_b$$

wherein R is a substantially saturated hydrocarbon-based group of an average at least 10 aliphatic carbon atoms; a and b are each independently an integer of one up to three times the number of aromatic nuclei present in Ar with the proviso that the sum of a and b does not exceed the unsatisfied valences of Ar; and Ar is a single ring, a fused or a linked polynuclear ring aromatic moiety having 0 to 3 optional substituents selected from the group consisting of lower alkyl, lower alkoxyl, halo and combinations of two or more of said optional substituents.

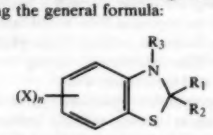
4,708,810

OXIDATION RESISTANT COMPOSITION CONTAINING A BENZOTHIAZOLINE COMPOUND

Herbert F. Askew, Blunsdon, and Paul R. Davies, Reading, both of United Kingdom, assignors to Castrol Limited, Wiltshire, England

Filed Nov. 15, 1984, Ser. No. 671,923
Claims priority, application United Kingdom, Nov. 17, 1983, 8330693
Int. Cl.[4] C07D 277/60; C09K 5/00; C10M 105/56
U.S. Cl. 252—50 12 Claims

1. A composition comprising an oxidatively degradable constituent and an oxidation inhibiting amount of a benzothiazoline having the general formula:



wherein R_1 and R_2 may be the same or different and may be a

hydrogen atom, a hydrocarbyl group, a substituted hydrocarbyl group, an amino group or a halogen atom, a hydroxyl group, alkoxy or aryloxy group, or R_1 and R_2 together may form a cyclic group which may optionally contain a heterocyclic atom; R_3 is a hydrogen atom or a hydrocarbyl group; X is an optional substituent on the aromatic nucleus and where more than one substituent is present each may be the same or different and may be hydrocarbyl, halogen, hydroxyl, carboxyl, amino or amido or any other group which would not interfere with the antioxidant properties of the compound; alternatively two substituents may be taken together to form a polycyclic compound which may be substituted in like manner; n is zero or an integer of from 1 to 4.

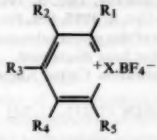
4,708,811

ELECTROLYTE FOR ELECTROLYTIC CAPACITOR

Fumihiko Shinozaki, and Yutaka Yokoyama, both of Ome, Japan, assignors to Nippon Chemi-Con Corporation, Tokyo, Japan

Filed Feb. 27, 1987, Ser. No. 19,867
Claims priority, application Japan, Feb. 28, 1986, 61-41739
Int. Cl.[4] H01G *9/00*
U.S. Cl. 252—62.2 **2 Claims**

1. An electrolyte for electrolytic capacitor containing within an aprotic solvent a tetrafluoroboric acid salt of a pyrylium or thiopyrylium compound of general formula,



in which R_1, R_2, R_3, R_4 and R_5 represent hydrogen atom, phenyl group or alkyl group having 1 to 15 carbon atoms and x represents oxygen or sulfur atom.

4,708,812

ENCAPSULATION OF PHASE CHANGE MATERIALS

James C. Hatfield, St. Albans, W. Va., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Jun. 26, 1985, Ser. No. 749,098
Int. Cl.[4] B01J *13/02*; C09K *5/06*
U.S. Cl. 252—70 **27 Claims**

1. Process for preparing encapsulated phase change material particles for reusable thermal energy storage, comprising:

(a) forming particles of a solid phase change material selected from the group consisting of a crystalline polymer, naphthalene, salt hydrate and a crystalline paraffin;

(b) contacting said solid phase change material particles with a first reactive monomer which is terminated with reactive groups and which is in a liquid state, said first reactive monomer not being reactive with said solid phase change material particles, said first reactive monomer forming a coating thereof on the surface of said solid phase change material particles;

(c) contacting said coated phase change material particles with a second reactive monomer which is terminated with reactive groups and which is in a liquid state; and

(d) condensation polymerizing said first reactive monomer and said second reactive monomer to form a continuous, elastomeric, condensation polymeric shell around said particles.

13. Encapsulated phase change material particles for reusable thermal energy storage, comprising:

(a) particles of said phase change material selected from the group consisting of a crystalline polymer, naphthalene, salt hydrate and a crystalline paraffin; and

(b) a continuous, elastomeric, condensation polymeric shell encapsulating said particles, said polymeric coating being formed from a first reactive monomer, and a second reactive monomer, said first reactive monomer having been coated on the surface of said particles (a) while said particles (a) were in a solid state.

4,708,813

NONLATHERING CLEANSING MOUSSE WITH SKIN CONDITIONING BENEFITS

William E. Snyder, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 765,901, Aug. 14, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 914,395
Int. Cl.[4] C11D *1/72, 3/22, 3/46, 17/04*
U.S. Cl. 252—90 **1 Claim**

1. A mousse-forming aerosol skin cleansing composition comprising:

A. from about 95% to about 99.5% of a concentrate, containing by weight of the concentrate:

1. from about 3% to about 9% of a mixture of methyl glucoside sesquistearate and the condensation product of about 20 moles of ethylene oxide with one mole of methyl glucoside sesquistearate, the said mixture having an HLB of from about 7 to about 18;
2. from about 1% to about 3% of cetyl alcohol;
3. from about 15% to about 25% of an emollient selected from the group consisting of mineral oil, ethylhexyloxystearate, myristyloxy(3)palmitate, lanolin alcohols and mixtures thereof;
4. from about 7% to about 15% glycerin;
5. the balance water; the weight ratio of Component (1.) to Component (2.) plus Component (3.) being from about 0.1:1 to about 0.5:1; and

B. from about 0.5% to about 5% nitrous oxide said composition being contained in a pressurized aerosol dispenser.

4,708,814

WATER TREATMENT COMPOSITIONS AND PROCESSES

Claude M. Stewart, 345 N. Beaverdam Rd., Asheville, N.C. 28804

Filed Oct. 2, 1986, Ser. No. 914,654
Int. Cl.[4] C02F *1/00*
U.S. Cl. 252—181 **12 Claims**

1. A composition for the treatment of water containing suspended solids comprising the combination of:

(a) a cationic polymer,

(b) aluminum chlorhydrate

(c) mica.

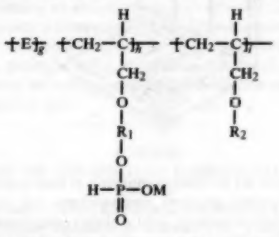
4,708,815

WATER TREATMENT POLYMERS AND METHODS OF USE THEREOF

Fu Chen, Newtown, and Keith A. Bair, Hatboro, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Division of Ser. No. 816,173, Jan. 3, 1986, Pat. No. 4,659,480, which is a continuation-in-part of Ser. No. 545,563, Oct. 26, 1983, abandoned. This application Feb. 10, 1987, Ser. No. 12,961
Int. Cl.[4] C02F *5/14*
U.S. Cl. 252—181 **7 Claims**

1. Composition comprising a water soluble polymer, said polymer comprising repeat units characterized by the structure



wherein E in the above formula is the repeat unit obtained after polymerization of an α, β ethylenically unsaturated compound, R_1 is a hydroxy substituted lower alkylene group having from about 1–6 carbon atoms or a non-substituted lower alkylene group having from about 1–6 carbon atoms; M is a

water soluble cation or hydrogen, wherein R_2 comprises a hydroxylated lower alkyl (C_1–C_6) group and the molar percentage of g in said polymer being between about 40–90 molar %, the molar percentage of h being between about 2–40 molar % and the molar percentage of i in said polymer being between about 1–35 molar %, the total of g, h, and i equalling 100 molar %.

4,708,816

BLEACH COMPOSITION CONTAINING CONTROLLED DENSITY CAPSULES

Daniel M. Chang, and Richard J. Wiersema, both of Pleasanton, Calif., assignors to The Clorox Company, Oakland, Calif.

Continuation of Ser. No. 574,545, Jan. 27, 1984, abandoned. This application Feb. 4, 1986, Ser. No. 825,959

Int. Cl.[4] C01B *11/06*; C09K *3/00*

U.S. Cl. 252—186.25 **5 Claims**

1. A composition useful for treating fabrics, comprising:

a liquid hypochlorite bleaching solution having a predetermined solution density; and

a plurality of microcapsules stably dispersed in the bleaching solution, the plurality of microcapsules having a controlled density distribution in the bleaching solution within about 0.05 g/cc of the solution density, the microcapsules having a polyethylene outer layer and an inner core selected from the group consisting of pigment, optical brightener and mixtures thereof, a density of the outer layer being less than the solution density, and a density of the inner core being greater than the solution density.

4,708,817

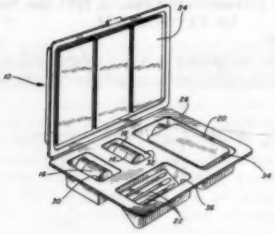
CREATIVE ART MEDIUM FOR FORMING ARTISTIC EXPRESSIONS HAVING A LATENT LUMINESCENT IMAGE PATTERN

Steven L. Dudnick, 7946 S. Kildare, Chicago, Ill. 60652

Filed Aug. 8, 1986, Ser. No. 894,618

Int. Cl.[4] C09K *11/06*

U.S. Cl. 252—301.16 **9 Claims**



1. A creative art medium comprising at least a pair of identical color matched pigment compositions, one of said pair including a light absorbent, light emitting component, said pair of compositions being in a coatable liquid vehicle for application to a substrate in at least a pair of coplanar patterns, said patterns being present side by side yet indistinguishable under one lighting condition, said one of said pair being distinguishable from the others under a different lighting condition due to light emitted only therefrom.

4,708,818

HUMAN IMMUNODEFICIENCY VIRUSES ASSOCIATED WITH ACQUIRED IMMUNE DEFICIENCY SYNDROME (AIDS), A DIAGNOSTIC METHOD FOR AIDS AND PRE-AIDS, AND A KIT THEREFOR

Luc Montagnier, Le Plessis Robinson; Jean-Claude Chermann, Elancourt; Francoise Barre-Sinoussi, Issy les Moulineaux; Francoise Brun-Vezinet, Paris; Christine Rouzioux, Paris; Willy Rozenbaum, Paris; Charles Dauguet, Paris; Jacqueline Gruest, L'Hay les Roses; Marie-Therese Nugeyre, Paris; Francoise Rey, Paris; Claudine Axler-Blin, Paris; Solange Chamaret, Paris, all of France; Robert C. Gallo and Mikulas Popovic, both of Bethesda, Md.; Mangalasseril G. Sarngadharan, Vienna, Va., assignors to Institut Pasteur, Paris, France, and The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Division of Ser. No. 558,109, Dec. 5, 1983, abandoned. This application Oct. 8, 1985, Ser. No. 785,638

The portion of the term of this patent subsequent to May 28, 2002, has been disclaimed.

Claims priority, application United Kingdom, Sep. 15, 1983, 8324800

Int. Cl.[4] G01N *33/535, 33/543, 33/569*

U.S. Cl. 435—5 **12 claims**

1. An in vitro diagnostic method for the detection of the presence or absence of antibodies which bind to antigens of a human retrovirus indicative of acquired immune deficiency syndrome (AIDS) or of lymphadenopathy-associated syndrome (pre-AIDS), which method comprises contacting a lysate of said human retrovirus comprising antigens of said retrovirus with a biological fluid for a time and under conditions sufficient for the retroviral antigens in the lysate and antibodies in the biological fluid to form antigen-antibody complexes and detecting the formation of the complexes.

4,708,819

REDUCTION OF VANADIUM IN RECYCLE PETROLEUM COKE

Stephen R. Vasconcellos, Langhorn, Pa.; Mitri S. Najjar, Hopewell Junction, and Ronald J. McKeon, Beacon, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Apr. 26, 1985, Ser. No. 727,954

Int. Cl.[4] C10J *3/46*

U.S. Cl. 252—373 **5 Claims**

1. In a process for the partial oxidation of particulate petroleum coke substantially comprising carbon and containing a small amount of ash comprising vanadium constituents and other materials to produce in a gas generating zone a raw gaseous stream comprising hydrogen and carbon monoxide and containing entrained unconverted particulate petroleum coke comprising carbon and vanadium containing ash, and said gaseous stream is cooled and scrubbed with water in gas cooling and scrubbing zones to produce a cooled and scrubbed clean gas stream and an aqueous dispersion of unconverted particulate petroleum coke; the improvement comprising:

(1) mixing said aqueous dispersion of unconverted particulate petroleum coke having a solids concentration in the

range of about 0.5 to 20.0 weight percent and a particle size so that 100% passes through ASTM E11-70 Standard Sieve Designation in the range of about 37 microns to less than about 1700 microns with about 0.05 to 0.50 weight percent (basis weight of said aqueous dispersion of unreacted petroleum coke) of a vanadium collection agent to selectively change the amount of vanadium constituents in the unconverted petroleum coke fractions in the froth and bottom layers; said collection agent having the following Formula:

$$C_9H_{19}—C_6H_4—(OC_2H_4)_4—OSO_3NA$$

and about 0.5 to 5.0 weight percent of a frothing agent selected from the group consisting of pine oil, cresylic acid, C_5 to C_8 carbon aliphatic alcohols, propylene glycol, and mixtures thereof to produce froth; and adjusting the pH of said mixture to a value in the range of about 3 to 10, providing the mixture is not already at said pH;

(2) aerating the mixed aqueous dispersion from (1) in a froth flotation zone with a gaseous material from the group consisting of air, nitrogen, carbon monoxide, steam, gaseous mixtures of H_2 and CO, and mixtures thereof, and with or without mechanical agitation, forming a layer of froth which floats on a bottom layer of aqueous dispersion, wherein;

(a) said aeration is continued until no more solid particles are visible in the foam and from about 5 to 25 weight percent of the unconverted particulate petroleum coke particles (basis carbon) have floated off in the froth, and said unconverted particulate petroleum coke in the froth substantially comprises carbon and also contains a small amount of ash with an increased amount of vanadium constituents; and

(b) the remainder of the unconverted particulate petroleum coke is suspended in the bottom layer of aqueous dispersion and substantially comprises carbon and also contains a small amount of ash with a decreased amount of vanadium constituents;

(c) where in comparison with the vanadium content of the ash in the unconverted particulate petroleum coke prior to the froth flotation treatment the vanadium content of the ash in the floated portion of unconverted particulate petroleum coke has been increased about 10 to 50 weight percent; and the vanadium content of the ash in the unconverted particulate petroleum coke in the bottom aqueous dispersion has been decreased about 5 to 50 weight percent;

(3) concentrating the bottom layer of aqueous dispersion from (2)(b) in a solids-liquid separation zone to produce water and a concentrated aqueous slurry of unconverted particulate petroleum coke having a solids concentration in the range of about 10 to 70 weight percent, or alternatively 100% weight percent solids, and said concentrated aqueous slurry or alternatively 100% solids is mixed with either, (1) dry fresh particulate petroleum coke constituents, or (2) slurries of said fresh particulate petroleum coke in water or in a liquid hydrocarbon fuel, or in mixtures thereof;

(4) recycling to said partial oxidation gas generating zone at least a portion of the mixture from (3); and

(5) introducing the froth in (2)(a) into a vanadium recovery zone.

4,708,820

METHOD OF PRODUCING PHENOL-TYPE NATURAL ANTIOXIDATIVE MATERIALS FROM PROCESSED SESAME SEED PRODUCTS

Mitsuo Namiki; Toshihiko Osawa; Yasuko Fukuda, all of Nagoya, and Tatsuhiko Ozaki, Nishio, all of Japan, assignors to Takemoto Yushi Kabushiki Kaisha, Aichi, Japan

Filed Nov. 27, 1985, Ser. No. 802,512

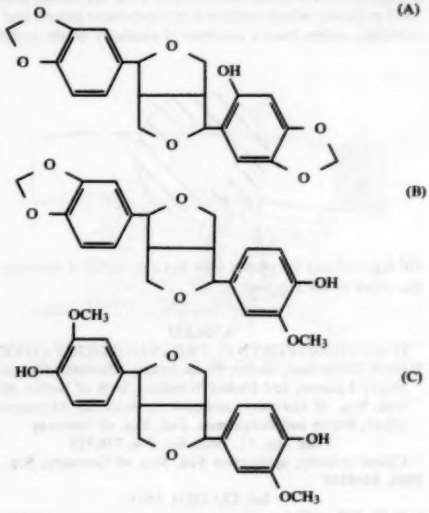
Claims priority, application Japan, Jun. 26, 1985, 60-140056

Int. Cl.[4] C09K *15/34, 15/08*

U.S. Cl. 252—398 **4 Claims**

1. A method of manufacturing phenol-type natural antioxidative materials containing analogs of sesamin or sesamolin comprising the steps of processing a processed sesame seed product with an acid catalyst, and subsequently concentrating and separating said materials by a physical means such as extraction, distillation and adsorption, said acid catalyst being one or more selected from the group which consists of Bronsted acids, Lewis acids, acid clay, activated clay, zeolite, silica-titanium oxide and cation exchange resins.

2. The method of claim 1 wherein said analog of sesamin contains one or more of the compounds shown by A, B and C:



4,708,821

PROCESS FOR PREPARING AQUEOUS GEL AND USE THEREOF

Wataru Shimokawa, Hachioji, and Katuaki Fukumori, Nagareyama, both of Japan, assignors to Hoechst Gosei Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 24, 1986, Ser. No. 843,430

Claims priority, application Japan, Mar. 27, 1985, 60-62690; Jul. 6, 1985, 60-149015; Nov. 11, 1985, 60-252488

Int. Cl.[4] A61K *7/46;* **C11B** *9/00*

U.S. Cl. 512—12 **12 Claims**

1. A process for preparing an aqueous gel which comprises mixing at least one water-soluble acetoacetylated high molecular compound selected from the group consisting of acetoacetylated polyvinyl alcohol, acetoacetylated hydroxyethyl cellulose, acetoacetylated hydroxypropyl cellulose, acetoacetylated methyl cellulose, acetoacetylated carboxymethyl cellulose and acetoacetylated starch, at least one cross-linking agent selected from the group consisting of a compound containing an amino group, a compound containing an aldehyde group, a compound containing a hydrazino group, a compound containing an epoxy group, a compound containing a methylol group, a metal alkoxide and a metal chelate and water, thereby cross-linking said high molecular compound to form an aqueous gel.

4,708,822

METHOD OF SOLIDIFYING RADIOACTIVE SOLID WASTE

Tetsuo Fukasawa; Fumio Kawamura, and Makoto Kikuchi, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 517,436, Jul. 26, 1983, abandoned. This application Sep. 5, 1985, Ser. No. 772,694

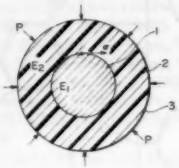
Claims priority, application Japan, Jul. 26, 1982, 57-130163

Int. Cl.[4] G21F *9/16;* **G21C** *21/00*

U.S. Cl. 252—628 **2 Claims**

1. A method of solidifying radioactive waste which com-

prises embedding mirabilite pellets that are obtained by drying, granulating and pelletizing radioactive solid waste, directly in a solidifying material to provide a solidified package; the solidifying material being a crosslinked plastic resin with a large distance between crosslinked points and having a modulus of elasticity that is smaller than the modulus of elasticity of the mirabilite pellets and the plastic resin being not greater than an external pressure applied to the solidified package, wherein the plastic resin is a polymer consisting of a styrene and an unsaturated polyester which contains a polybutadiene glycol, and the mirabilite pellets have a modulus of elasticity on the order of



10^3 Kg/cm^2 and the plastic resin has a modulus of elasticity on the order of 10^2 Kg/cm^2.

4,708,823

17 α-CHLOROETHYNYL PREGNANE DERIVATIVES

Helmut Hofmeister, Berlin; Klaus Annen, Muenster-Albachten; Henry Laurent, and Rudolf Wiechert, both of Berlin, all of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

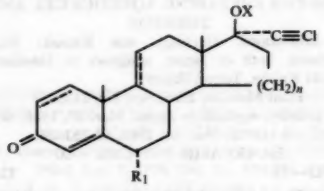
Filed Sep. 17, 1985, Ser. No. 776,923

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1984, 3434448

Int. Cl.[4] C07J *1/00*

U.S. Cl. 260—397.4 **9 Claims**

1. An ester of the formula



wherein

in each case is a single or double bond,

n is 1 or 2,

R_1 is hydrogen or methyl, and

X is nitro, trifluoroacetyl, or trichloroacetyl.

4,708,824

PROCESS FOR THE PREPARATION OF CHLORO(PHENYL)PHOSPINES

Hans-Jerg Kleiner, Kronberg/Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Jun. 28, 1985, Ser. No. 750,030

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1984, 3424182

Int. Cl.[4] C07F *9/52*

U.S. Cl. 260—543 P **9 Claims**

1. A process for the preparation of chloro(diphenyl)phosphine which comprises reacting diphenylphosphinic (acid) chloride with triphenylphosphine to deoxygenate the diphenylphosphinic (acid) chloride at a temperature between about 300° and about 600° C.

4,708,825

PROCESS FOR THE PRODUCTION OF PENICILLINS

Gerd Ascher, Wörgl, and Kurt Riedl, Kufstein, both of Austria, assignors to Biochemie, Tyrol, Austria

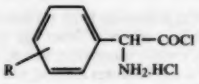
Continuation of Ser. No. 394,796, Jul. 2, 1982, abandoned, which is a continuation of Ser. No. 300,898, Sep. 9, 1981, abandoned, which is a continuation of Ser. No. 143,572, Apr. 25, 1980, abandoned. This application Jul. 8, 1983, Ser. No. 512,162

Claims priority, application Austria, Apr. 25, 1979, 3089/79; Sep. 4, 1979, 5852/79; Sep. 4, 1979, 5851/79

Int. Cl.[4] C07C *101/04*

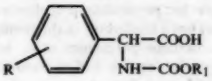
U.S. Cl. 2600—544 N **7 Claims**

1. A process for the production of a compound of formula I,



I

in which R is hydroxy, comprising reacting a compound of formula II,



II

in which

R is as defined above, and

R_1 is straight-chain or branched lower alkyl, or benzyl

with thionyl chloride in the presence of a strong acid, and reacting the resulting product with gaseous hydrogen chloride.

4,708,826

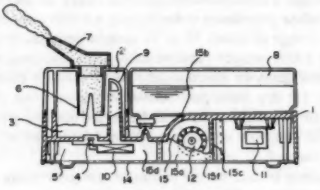
SUPERSONIC HUMIDIFIER

Saburo Mizoguchi, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 6, 1985, Ser. No. 708,714

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—30 **4 Claims**



1. In a supersonic humidifier comprising

a housing having a bottom surface,

a motor having a shaft disposed below said bottom surface,

a centrifugal ventilator fan mounted on said shaft, and

a bottom cover for said housing adapted to sealingly cover said bottom surface,

the improvement wherein said humidifier further comprises

a casing which encloses said fan, said casing having a side wall, a back wall and a top wall which are unistructurally formed on said bottom surface, and

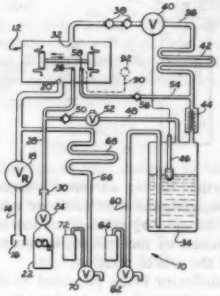
a holder for supporting said motor, said holder having an air intake opening and being disposed between said fan and said motor.

4,708,827

METHOD OF AND APPARATUS FOR MAKING AND DISPENSING CARBONATED WATER WITH A DOUBLE DIAPHRAGM PNEUMATIC WATER PUMP

John R. McMillin, Maplewood, Minn., assignor to The Cornelius Company, Anoka, Minn.

Filed Mar. 17, 1986, Ser. No. 840,230
Int. Cl.[4] B01F 3/04
U.S. Cl. 261—35 29 Claims



19. A method of boosting water pressure and supplying quantities of water at the boosted pressure with a double diaphragm continuous delivery pneumatically powered liquid pump, comprising the steps of:

providing and controlling the
water supply pressure (Pws)
water boosted pressure (Pwb),
pneumatic propellent pressure (Pp), and the
propellent exhaust back pressure (Pe),
according to the algorithm

$$Pwb_{max}=Pp-Pe+Pws,$$

by maintaining Pe greater than Pws with control means connected to a propellent gas exhaust from the pump and to a water supply line into the pump, for controlling the valves of Pe and Pws respectively, and thereby preventing inversion of the diaphragms in the pump while reciprocating the diaphragm in the pump and pumping water at up to Pwb_{max}.

26. A pneumatically powered water pressure boosting apparatus

(a) operatively defined by the algorithm

$$Pwb_{max}=P_p-P_e+P_{ws},$$

wherein:

P_{wb}=boosted water pressure, out of the pump,

P_p=pneumatic propellent pressure into the pump,

P_e=propellent exhaust back pressure at the pump,

P_{ws}=water supply pressure at the pump; and having

(b) a double diaphragm continuous delivery pneumatically powered liquid pump having a liquid inlet connectible to the water supply pressure, a liquid outlet for water at the boosted pressure, a gas inlet connectible to the propellent pressure, and a gas outlet subjectable to said exhaust back pressure;

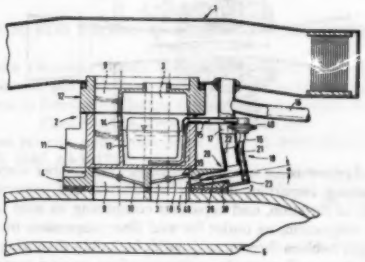
(c) means connected to said gas outlet and said liquid inlet for maintaining P_e greater than P_{ws}.

4,708,828

CARBURETOR FOR IC ENGINES AND AN IDLING INSERT THEREFOR

Joseph Plannerer, Riesstr. 70, D-8000 München 50, Fed. Rep. of Germany

Filed Apr. 18, 1986, Ser. No. 853,507
Claims priority, application Fed. Rep. of Germany, Feb. 14, 1986, 3604715
Int. Cl.[4] F02M 3/10
U.S. Cl. 261—41.5 20 Claims



1. A carburetor for an IC engine comprising

an aintake duct (3) opening at one end into the atmosphere and connected at the other end with an intake pipe (5) of a manifold (6) of an IC engine,

a throttle valve (8) located in said intake duct (3) so as to at least essentially shut off said intake duct (3) in an idling position, and

idling duct means (18) bypassing said throttle valve (8), said idling duct means including feed duct means (24) for supplying combustion air for the formation of a desired fuel-air mixture, said means for supplying including a fuel duct means and a fuel outlet orifice connected to said fuel duct means (27),

said idling duct means (18) being formed with a bore constriction (41) upstream from said outlet orifice (42) of the idling duct means (18) in the intake duct (3) for the production of a supersonic flow, and

characterized in that

said fuel duct means (27) is in the form of tubular nozzle (32), said fuel duct means being disposed within said feed duct means for the combustion air, said tubular nozzle being located concentrically in said feed duct means (24) for the combustion air, said tubular nozzle being connected to a tube (26) with said tube having at least one peripheral port (35) for the inlet of combustion air, said tubular nozzle having said outlet orifice (34) which is located in said bore constriction (41) and said outlet orifice being located adjacent a sonic Laval plane defined by said bore constriction, said concentric feed duct means having a downstream end relative to said orifice (34) which includes a diverging portion for containing supersonic flow under Laval conditions.

4,708,829

APPARATUS FOR THE REMOVAL OF IMPURITIES FROM FIBER SUSPENSIONS

Bo V. S. Byléhn, Sundsvall, and Inge H. Granqvist, Alnö, both of Sweden, assignors to Sunds Defibrator Aktiebolag, Sweden

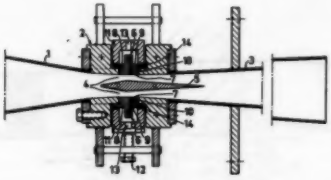
PCT No. PCT/SE84/00305, § 371 Date May 28, 1985, § 102(e) Date May 28, 1985, PCT Pub. No. WO85/01888, PCT Pub. Date May 9, 1985

PCT Filed Sep. 21, 1984, Ser. No. 740,063

Claims priority, application Sweden, Oct. 27, 1983, 8305912

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—62 **10 Claims**



1. Apparatus for mixing gas bubbles into a fiber suspension containing impurities in order to remove said impurities by means of flotation, said apparatus comprising an inlet for said fiber suspension, an outlet for said fiber suspension including said gas bubbles therein, said outlet including diverging upper and lower wall portions, an intermediate mixing section between said inlet and said outlet, said intermediate mixing section including an upper wall surface, a lower wall surface, and a wing member immovably disposed between said upper and lower wall surfaces thereby creating upper and lower wall passages between said wing member and said upper and lower wall surfaces of said intermediate mixing section, said wing member including an imperforate, continuous external surface, a diverging portion facing said inlet, a converging portion facing said outlet, and a central portion having a maximum thickness therebetween, whereby said upper and lower passages have a minimum transverse dimension at a location corresponding to the central portion of said wing member, said converging portion of said wing member corresponding with said diverging upper and lower wall portions of said outlet, whereby said upper and lower passages diverge substantially symmetrically in the direction of flow of said fiber suspension containing said gas bubbles therein, gas injection means including a transversely extending slot in both said upper and lower wall surfaces of said intermediate mixing section at locations corresponding to said central portion of said wing member, said gas injection means comprising adjustable gas injection means, including upper and lower pairs of axially movable nozzle portions adjustably carried in corresponding recesses formed in said upper and lower wall surfaces of said mixing section, for adjusting the dimensions of said transversely extending slot, and gas supply means communicating with said gas injection means for supplying said gas to said fiber suspension flowing through said upper and lower passages of said intermediate mixing section.

4,708,830

SEAL ASSEMBLY

Charles G. Shepherd, Oakville, and Samuel Travale, Stoney Creek, both of Canada, assignors to B. D. Wait Co. Limited, Oakville, Canada

Filed Dec. 5, 1986, Ser. No. 938,478

Int. Cl.[4] B01F *3/04*

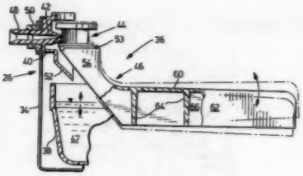
U.S. Cl. 261—70 **14 Claims**

1. A seal assembly for a float valve adapted to control liquid entering the float valve via an inlet nozzle located above a receptacle positioned to catch liquid from the nozzle, the float valve having a float structure mounted for angular movement responsive to the level of liquid in the receptacle, and the seal assembly comprising an adjustment knob and a collar located around the knob;

the adjustment knob being adapted to be coupled to the float structure for rotation about an axis of rotation which, in use, is transverse to the inlet nozzle;

and the knob having an outer wall of which at least a portion is eccentric with respect to said axis of rotation;

the collar having an inner wall which bears against said eccentric portion such that the collar may move radially when the knob is rotated;



the collar further having an outer obstruction region for sealingly engaging the inlet nozzle at a liquid level in the receptacle selected by rotation of the adjustment knob, and determined by the spacing between the obstruction region and the axis of rotation;

at least one deflector being provided to either side of the obstruction region to limit spray from the inlet nozzle; and

the seal assembly having locating means adapted to co-operate with the float valve for minimizing rotation of the collar with the knob.

4,708,831

METHODS OF AND/OR APPARATUS FOR HUMIDIFYING GASES

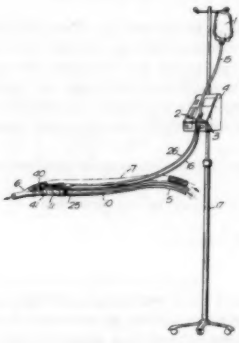
Adrian J. Elsworth; Michael G. Daniell; Paul Zwaan, and David P. M. Stewart, all of Auckland, New Zealand, assignors to Fisher & Paykel Limited, Auckland, New Zealand

Filed May 21, 1986, Ser. No. 865,884

Claims priority, application New Zealand, May 22, 1985, 212163; Dec. 23, 1985, 214694; Feb. 12, 1986, 215123

Int. Cl.[4] A61M *16/16*

U.S. Cl. 261—130 **22 Claims**



1. A method of humidifying gases, said method comprising the steps of supplying water into a first passageway by passing the water from a source of substantially constant positive pressure to said first passageway, heating said water by means of an electrical resistance heater in said water in said first passageway, passing gases through a second passageway, causing water vapour but substantially no liquid water to pass through a microporous wall common to both said passage-

ways, said microporous wall being permeable to water vapour but substantially impermeable to liquid water, the water vapour passing through said microporous wall being entrained in the passing gases to humidify said gases for transmission to a point of use, monitoring the temperature of the humidified gases, causing changes in temperature of the humidified gases to cause changes in the supply of heat to said water to maintain the temperature of humidified gases within a desired range of temperatures, monitoring the rate of flow of water of said first passageway, generating electrical signals representative, respectively, of the following parameters:

1. rate of flow of said water to said first passageway,
2. temperature of humidified gases flowing in said second passageway, and
3. heat input to the water in said first passageway,

and causing a cessation of flow of water and heat to said water when at least one of said parameters varies from a desired value by more than a predetermined amount.

4,708,832

CONTACT BODY

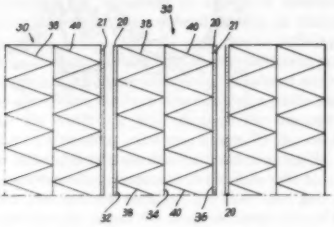
Per G. Norback, Lidingo, Sweden, assignor to Aktiebolaget Carl Munters, Sollentuna, Sweden

Continuation of Ser. No. 698,604, Feb. 6, 1985, abandoned. This application Jul. 28, 1986, Ser. No. 888,641

Claims priority, application Sweden, Feb. 17, 1984, 8400302

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—153 **9 Claims**



1. A contact body for indirect evaporative cooling of a first airstream of useful air by means of a second airstream of cooling air, comprising:

a plurality of panels, each panel including a pair of planar, substantially parallel plates made of a first heat conductive material and a corrugated plate made of a second heat conductive material, each of the planar plates having an outside wall and an inside wall, the corrugated plate having a plurality of corrugations, the tips of the corrugations being in heat conductive contact with the inside walls of said planar plates, said planar plates and said corrugated plate defining a plurality of flow passages for the useful airstream; each panel further including a moisture-impervious layer convering each wall of said planar plates and a moisture-absorbing layer covering each of the moisture-impervious layers;

a plurality of spacers;

wherein at least two spacers are positioned between and separate two of said panels, said at least two spacers contacting the moisture-absorbing layers of said two panels, said at least two spacers and said two panels defining at least one flow passage for the cooling airstream; and

wherein the width of said plurality of flow passages for the useful airstream is greater than the width of said at least one flow passage for the cooling airstream; whereby the width of said plurality of flow passages for the useful airstream and the width of said at least one flow passage for the cooling airstream may be varied independently of one another by varying the width of said corrugated plate and the width of said spacers, respectively; and

wherein each panel includes at least three planar, substantially parallel plates made of the first heat conductive material and at least two corrugated plates made of the second heat conductive material, each of the planar plates having two walls, each of the corrugated plates having a plurality of corrugations, the tips of the corrugations of each corrugated plate being in heat conductive contact with opposed walls of the associated pair of planar plates; and wherein the moisture-impervious layers and the moisture-absorbing layers are located on the planar plate walls not contacting the corrugated plates.

4,708,833

METHOD FOR PRODUCING ELASTOMERIC OPTICAL FIBER

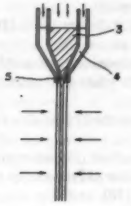
Yoshitaka Ohsawa; Yutaka Shibata; Shin-ichiro Niwa; Akira Nishimura, and Takafumi Uemiya, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed May 13, 1986, Ser. No. 862,797

Claims priority, application Japan, May 13, 1985, 60-101729; May 13, 1985, 60-101730

Int. Cl.[4] B29D *11/00*; G02B *6/02*

U.S. Cl. 264—1.5 **13 Claims**



1. A method for producing an elastomeric optical fiber comprising the steps of:

flowing down a liquid polymer for the core and simultaneously cross-linking the polymer to form a core made of an elastomer with rubber elasticity, and

applying the cladding around the core simultaneously with or after the formation of the core so as to surround the core.

4,708,834

PREPARATION OF GELATIN-ENCAPSULATED CONTROLLED RELEASE COMPOSITION

Jonathan M. Cohen, Matawan; Ira R. Berry, Westfield, and Lionel Borkan, New Vernon, all of N.J., assignors to Pharmacaps, Inc., Elizabeth, N.J.

Filed May 1, 1986, Ser. No. 858,969

Int. Cl.[4] B01J *13/02*

U.S. Cl. 264—4.3 **5 Claims**

1. A method for preparing a controlled-release pharmaceutical unit dosage form comprising:

(a) forming a liquid fill comprising an aqueous solution or dispersion of a polysaccharide gum and a pharmaceutically-active compound;

(b) encapsulating said liquid fill in a gelatin capsule; and

(c) gelling said liquid fill with an effective amount of a cationic gelling agent comprising metal cations or ammonium ions to form a polymeric matrix having said active compound uniformly dispersed throughout.

4,708,835

METHOD AND APPARATUS FOR MAKING A DENTAL MODEL MOUNTED ON A BASE PLATE

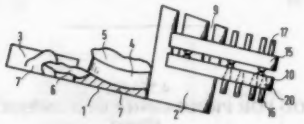
Wilhelm H. Kiefer, Obere Mühlstrasse 8, D-7520 Bruchsal 4, Fed. Rep. of Germany

Filed Sep. 30, 1985, Ser. No. 781,955

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1984, 3436094

Int. Cl.[4] A61C *13/08, 13/10*

U.S. Cl. 264—17 19 Claims



1. Method of producing a dental model, with individually removable teeth, mounted on a flat base plate (15), by filling a dental impression (5), mounted on a carrier plate (1) having guide means (9), with hardenable molding material, including inserting holding pins, one end of each holding pin (17) corresponding to each tooth, tooth stump, or missing tooth into the unhardened molding material with the other end of the pin disposed in a hole (18) in the base plate,

comprising the steps of:

placing a transparent datum plate (10) over the impression (5) in said guide means (9),

marking the desired positions of said holding pins (17) on the side of the datum plate (10) remote from the impression (5),

providing the base plate (15) with a field of closely adjacent holes (18),

flipping the datum plate (10) over in said guide means (9),

placing said base plate (15) over the marking-remote side of the datum plate (10), and

inserting said holding pins (17) in said base plate (15) at positions corresponding to the markings on the datum plate (10).

9. Dental model making apparatus to provide a dental model with individually removable teeth by filling a dental impression (5) having depressions corresponding to each tooth, tooth stump or missing tooth with a hardenable molding material in which a holding pin (17) is to be inserted,

said apparatus being utilized in carrying out the method of claim 1,

and comprising

a carrier plate (1), the impression (5) being secured to said carrier plate;

a datum plate (10) of transparent material and being formed with a field of closely paced holes (12);

guide means (9) secured to said carrier plate and guiding the position of the datum plate (10) with respect to the impression (5);

a plurality of marker pins (16) for placement in selected ones of said holes (12) to mark a tooth, tooth stump or missing tooth on said datum plate while maintaining proper registration with the impression (5);

a base plate (15) engageable with said guide means for guiding the position of said base plate (15) with respect to said impression and to said datum plate (10),

said base plate being formed with a field of closely spaced holes (18) corresponding to and in alignment with the holes (12) in said datum plate when said base plate is located in said guide means adjacent said datum plate;

wherein the respective fields of holes (12, 18) of said datum plate (10) and of said base plate (15) are each mirror symmetrical about an axis through the middle of said guide means (9); and

holding pins (17) located in selected ones of the closely spaced holes (18) of the base plate (15) corresponding to the position of marker pins (16) located in the holes (12) of the datum plate (10).

4,708,836

PROCESS FOR PRODUCING AN ARTIFICIAL CRANIUM AND A PROSTHETIC HEAD

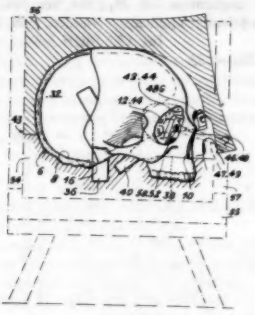
Robert Gain, Chelles; Jacques Simon, Ivry; André Pasturel, Paris, and Marc Roger, Maisons Alfort, all of France, assignors to Commissariat a l'Energie Atomique and L'Etat Francais, both of, France

Filed Mar. 20, 1986, Ser. No. 841,821

Claims priority, application France, Mar. 22, 1985, 85 04284

Int. Cl.[4] B29C *33/40;* G09B *23/06, 23/30*

U.S. Cl. 264—40.1 15 Claims



1. A process for producing an artificial cranium by moulding a first material in a mould which is in several parts, said cranium having at least one cavity, wherein it comprises the following stages:

(a) determining the compression modulus of elasticity at different points of a fresh cranium,

(b) calculating the equivalent thicknesses of the first material, so that the compression strength is the same at each considered point,

(c) producing a model cranium with the thus calculated equivalent thicknesses, said model cranium having a cavity corresponding to that of the cranium to be produced,

(d) taking an external impression of the model cranium in two stages in order to obtain a two-part mould,

(e) taking an impression of the cavity of the model cranium in order to obtain a first core, stages (d) and (e) being performed simultaneously,

(f) eliminating the model cranium,

(g) taking an impression of the first core to obtain a countermould,

(h) producing in said countermould a second core of a second material, which can be selectively eliminated with respect to the first,

(i) placing the second core in one of the mould parts by orienting it using appropriate positioning means,

(j) closing the mould by assembling its different parts,

(k) introducing the first material into the mould,

(l) allowing the first material to harden,

(m) separating the different parts of the mould, and

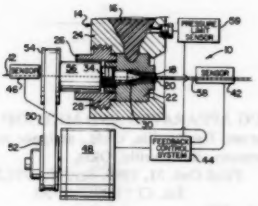
(n) eliminating the second core.

4,708,837

METHOD AND APPARATUS FOR INSULATING ELECTRICAL CONDUCTOR

Gordon D. Baxter, and James C. Grant, both of Kingston, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Apr. 9, 1986, Ser. No. 849,628
Int. Cl.[4] B29C 47/92
U.S. Cl. 264—40.4 9 Claims



1. Apparatus for insulating an electrical conductor wire comprising an extruder cross-head having an extrusion die defining a die orifice, internal wall means defining a flow passage for directing molten polymeric dielectric material to the die orifice, a core tube within the cross-head and upstream from the die orifice, the core tube defining a guide passage for directing the conductor wire through the die orifice as it moves along a passline, mounting means for the core tube to render it adjustable into any desired position along the passline, drive means operably connected to the core tube to controllably adjust the distance between the core tube and the wall means and thereby adjust the cross-sectional area of the flow passage, a monitoring means downstream from the cross-head for monitoring a parameter indicative of the thickness of the conductor wire when covered with the insulation layer, and an analyzing and control means to analyze monitored values received from the monitoring means and for controlling the position of the core tube along the passline, said means operable upon a monitored value differing from that required for a desired thickness of conductor wire to actuate the driving means and move the core tube in the appropriate direction to change the conductor wire thickness towards that desired.

5. A method of insulating an electrical conductor wire comprising:

passing the wire along a passline through a core tube in a cross-head and then through a die orifice of an extrusion die of the cross-head while extruding a molten polymeric dielectric material around the wire;

monitoring a parameter indicative of the thickness of the wire at a position downstream from the cross-head to determine whether the wire thickness differs from that desired; and

upon any monitored value differing from that required for a desired conductor wire diameter, controllably moving the core tube in an appropriate direction along the passline and into a desired position so as to controllably adjust the distance between the core tube and an internal wall means of the cross-head which defines a flow passage for directing molten polymeric dielectric material to the die orifice and thereby adjusting the effective cross-sectional area of the passage to cause the thickness of the wire to approach that desired.

4,708,838

METHOD FOR FABRICATING LARGE CROSS SECTION INJECTION MOLDED CERAMIC SHAPES

Gautam Bandyopadhyay, Acton, Mass.; Kenneth W. French, Merrimack, N.H.; Leslie J. Bowen, Concord, and Jeffrey T. Neil, E. Pepperell, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Mar. 26, 1985, Ser. No. 716,274
The portion of the term of this patent subsequent to Nov. 3, 2004, has been disclaimed.
Int. Cl.[4] C04B 35/64
U.S. Cl. 264—63 30 Claims

1. A method for fabricating a large cross-sectional ceramic article by injection molding comprising the following steps:

Step 1. compounding a ceramic powder with about 34 to about 42 v/o of a binder to form a blend, said ceramic powder having a mean particle size from about 2 to about 12 microns;

Step 2. injection molding the product from step 1 to form a molded ceramic article having a cross-section greater than about one centimeter;

Step 3. embedding the product from step 2 in a setter bed containing a setter powder to form a binder retarding layer of said setter powder on said molded ceramic article;

Step 4. heating the product of step 3 in a non-oxidizing environment at a heating rate equal to or greater than 1° C. per hour;

Step 5. retarding the removal of said binder from said molded ceramic article sufficiently to maintain equal to or greater than 80 w/o of said binder within said molded ceramic article until a temperature of 400° C. is obtained;

Step 6. increasing the temperature from step 5 to 450° C. at a heating rate equal to or greater than 1° C. per hour in a non-oxidizing environment to allow breakdown of the binder retarding layer and to allow binder vaporization;

Step 7. increasing the temperature from step 6 to about 600° C. and maintaining the product at 600° C. in air for a period sufficient to completely remove said binder from said molded ceramic article;

Step 8. cooling the product from step 7 to room temperature to obtain an externally crack-free injection molded and binder free ceramic article having a cross section greater than one centimeter;

Step 9. isopressing the product from step 8 at a pressure equal to or greater than 5,000 psi; and

Step 10. sintering the product from step 9 at a temperature sufficient to obtain a density greater than 98% of theoretical density.

4,708,839

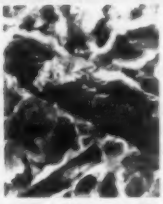
METHOD OF COMPRESSIVELY MOLDING ARTICLES FROM RESIN COATED FILLER MATERIALS

Richard J. Bellet, Boonton Township, Morris County; Ephraim Broyer, Murray Hill; Alex Y. Bekker, Hackensack, all of N.J., and Melvin A. Lace, Prospect Heights, Ill., assignors to Amphenol Corporation, Wallingford, Conn.

Filed Dec. 30, 1985, Ser. No. 814,845
Int. Cl.[4] B29C 43/00, 67/16
U.S. Cl. 264—85 11 Claims

1. In a method of compressively molding articles comprising the steps of compressing a predetermined amount of a moldable composition comprised of resin and filler material in a mold cavity, with the application of heat and pressure to cure and/or solidify the composition to the shape of the mold cavity, the improvement wherein said composition comprises filler material in the form of individual particles of a powder having a plastic resin precipitated on surfaces of the individual filler material powder particles, with said filler material comprising about 60–98% by weight of the composition, compressing the material in the form of coated individual particles initially at room temperature at a rate sufficient to achieve an adiabatic increase in temperature to above the glass transition temperature (Tg) of the resin, and the rate being less than about 1–2

seconds to achieve maximum pressure, in said mold cavity, sufficient to reduce the composition powder volume resulting in a part conforming to the mold cavity, subsequently heating the part outside the mold to a temperature equal to about the crystallization temperature of the plastic resin for a time sufficient to crystallize the plastic resin, and thereafter allowing the



resultant part to cool to result in a compressively molded part having a substantially high proportion of reinforcing filler whereby the amount of plastic resin required to mold said part is substantially reduced, and whereby the time required to mold such articles is reduced due to a reduction in the time required in the mold.

4,708,840

MANUFACTURE OF PNEUMATIC TIRES

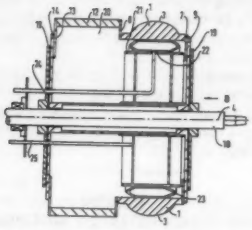
James N. McGlashen, Near Wigan, England, assignor to Apsley Metals Limited, a British Company, United Kingdom

Division of Ser. No. 576,578, Feb. 3, 1984, Pat. No. 4,597,728. This application Apr. 23, 1986, Ser. No. 855,157

Claims priority, application United Kingdom, Feb. 24, 1983, 8305084

Int. Cl.[4] B29H *5/04*

U.S. Cl. 264—501 **1 Claim**



1. A method of consolidating an annulus of uncured elastomeric tread compound for a pneumatic vehicle tire in which said annulus is located radially inwards of a patterned annular tread mold, and is consolidated in the tread mold by apparatus applying a radially outwardly directed consolidation pressure to the annulus, said apparatus comprising in combination:

(a) a set of rigid segments arranged in sliding engagement to form a consolidation ring and which are radially movable between a first smaller diameter, and a second larger diameter at which the segments form a smooth continuous consolidating surface,

(b) mechanical means for moving the segments radially from the first diameter substantially to said second diameter without applying substantial outward radial pressure, and

(c) fluid inflatable means slidably movable from a first position alongside the rigid segments to a second position radially and axially within the rigid segments to apply radial outward pressure evenly around the radially inner surface of the consolidation ring of segments to move the segments to bring them completely to the second diameter to apply consolidation pressure to the annulus, said method comprising arranging said set of segments to said first diameter and positioning said set of segments radially inwardly of the tread in the mold, expanding the segments substantially to the second diameter by operation of said mechanical means, moving the inflatable means from said first position to said second position, and applying fluid pressure within the inflatable means to complete the segment movement to said second diameter and to apply a balanced consolidation load on the tread compound as it is held in the tread mold.

4,708,841

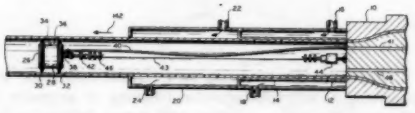
PIPE PLUG APPARATUS AND METHOD FOR ITS USE

Olaf E. Larsen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 31, 1985, Ser. No. 793,353

Int. Cl.[4] B29C *47/90*

U.S. Cl. 264—558 **16 Claims**



1. An apparatus comprising:

a pipe plug which includes a first portion having an exterior surface with a plug outlet fluid passageway therethrough, said plug also including second and third portions, adapted to sealingly engage around their circumferences the interior surface of a pipe, which radially extend from said exterior surface so as to surround said first portion and which are axially spaced from one whereby a space which communicates with said plug outlet fluid passageway is defined between said second portion and said third portion, said space also being defined by said exterior surface, and wherein no fluid passageway is provided which passes through said exterior surface to communicate with said space other than said plug outlet fluid passageway; and

a means for introducing a liquid through said plug outlet fluid passageway and into said space.

12. A method of plugging a pipe, comprising:

(a) positioning a pipe plug within said pipe, said plug comprising a first portion having an exterior surface, said plug also comprising second and third portions which radially extend from said exterior surface and which are axially spaced from one another, each of said second and third portions surrounding said first portion, wherein each of said second and third portions is in sealing engagement around the circumference thereof with the interior surface of said pipe, and wherein a space is defined between said second portion and said third portion and between said first portion exterior surface and said interior surface of said pipe; and

(b) maintaining a condition whereby said space is at least partially filled with liquid, wherein no liquid is passed through a fluid passageway extending through said exterior surface other than a plug outlet fluid passageway which extends through said exterior surface to communicate with said space, and wherein liquid is allowed to fill said space to a certain liquid level wherein the buoyant force exerted on said plug approximately equals the weight of said plug.

4,708,842

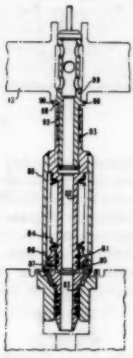
FLUID MODERATOR CONTROL SYSTEM FUEL ASSEMBLY SEAL CONNECTOR

Luciano Veronesi, O'Hara Township, Allegheny County; Stephen N. Tower, Washington Township, Westmoreland County, and William E. Klassen, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 626,942, Jul. 2, 1984, abandoned. This application Jan. 2, 1986, Ser. No. 815,779

Int. Cl.[4] G21C *13/00*

U.S. Cl. 376—203 19 Claims



1. A nuclear reactor comprising fuel assemblies having one or more flow channels therethrough, a core support plate having one or more flow channels therethrough, and seal connectors for sealingly connecting said one or more flow channels in said core support plate with said one or more flow channels in said fuel assemblies, said seal connectors each comprising a first portion, a second portion, said first and second portions each comprising an elongated member having a flow channel therethrough and being in substantial axial alignment with each other and being separated by a space therebetween, means for sealingly connecting said first portion to one or said one or more flow channels in said fuel assemblies, means for sealingly connecting said second portion to said first portion and for allowing relative motion between said portions, means for limiting the relative motion of said first and second portions in directions toward and away from each other, means for reconnectingly connecting and resealingly sealing said second portion to one of said one or more flow channels in said core support plate, comprising a slip fit connection whereby the remote end of the second portion fits within an opening in the core support plate which is in flow communication with said one or more flow channels in said core support plate and further comprises a ball and cone seal in series with a plurality of axially spaced ring seals.

4,708,843

CONTROL UNIT FOR A NUCLEAR REACTOR

Guy Desfontaines, and Michel Le Helloco, both of Paris, France, assignors to Framatome, Courbevoie, France

Filed Jan. 28, 1981, Ser. No. 229,227

Claims priority, application France, Feb. 8, 1980, 80 02861

Int. Cl.[4] G21C *7/00, 19/00*

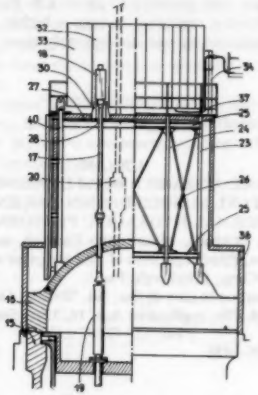
U.S. Cl. 376—219 4 Claims

1. Control unit for a nuclear reactor having a tank, comprising

(a) a plurality of sealed vessels communicating with the inside of said tank so as to extend said tank, above its cover, in the vertical direction, each of said sealed vessels containing a displacement mechanism for a cluster of material absorbing neutrons in the core of said reactor, driven by a driving device comprising a motor positioned in the upper part of said sealed vessel;

(b) a strong vertical structure fast to said cover of said tank occupying the height of said sealed vessels to a level below said motors;

(c) a horizontal protection plate fixed to the upper part of



said vertical structure at a level below said motors and having openings for the passage of said sealed vessels;

(d) an envelope insulating said sealed vessels from the external medium to a level below said motors; and

(e) a plurality of vertical aeration ducts positioned above said horizontal protection plate and, each surrounding a motor.

4,708,844

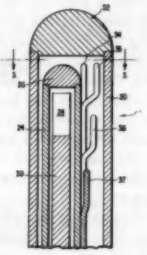
REACTOR MONITORING ASSEMBLY

William B. Kearton, Pittsburgh; Kenneth A. Kloes, Penn Hills Township, Allegheney County, and Joel R. Terry, Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 20, 1984, Ser. No. 591,637

Int. Cl.[4] G21C *17/00*

U.S. Cl. 376—247 7 Claims



1. In a nuclear reactor core, a plurality of combined in-core flux detector and thermocouple assemblies, each said assembly comprising: an outer tube which is sealed at its upper end; an inner tube disposed within, and extending along the length of, said outer tube; neutron detector means disposed within said inner tube; means connected to said neutron detector means for displacing said neutron detector means along the length of said inner tube; and a plurality of thermocouples disposed outside of said inner tube and enclosed within said outer tube, said

plurality of thermocouples comprising one group of thermocouples which are spaced apart along the length of said outer tube, wherein said group of thermocouples of each said assembly is connected to constitute a back-up coolant level monitoring means, and said assemblies are distributed over a selected region of the reactor core, with the locations of said group of thermocouples along the length of said outer tube being different from one said assembly to another to provide a coolant level monitoring operation having a higher precision than could be achieved by one said assembly alone.

4,708,845

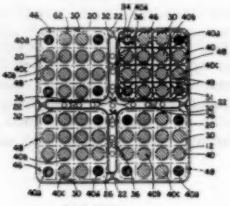
BWR FUEL ASSEMBLY WITH IMPROVED SPACER AND FUEL BUNDLE DESIGN FOR ENHANCED THERMAL-HYDRAULIC PERFORMANCE

Claude M. Mildrum, Monroeville Borough, and Rusi P. Taleyarkhan, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 789,256, Oct. 18, 1985, abandoned. This application Apr. 16, 1986, Ser. No. 852,853

Int. Cl.[4] G21C *3/32*

U.S. Cl. 376—435 **7 Claims**



1. In a fuel assembly having a bundle of elongated fuel rods disposed in side-by-side relationship so as to form an array of spaced fuel rods, an outer tubular flow channel surrounding said fuel rods so as to direct flow of coolant/moderator fluid along said fuel rods, a hollow water cross extending centrally through and interconnected with said outer flow channel so as to divide said channel into separate compartments and said bundle of fuel rods into a plurality of mini-bundles thereof being disposed in said compartments, and a plurality of spacers axially displaced along said fuel rods in each of said mini-bundles thereof, each spacer being composed of inner and outer means which together define spacer cells at corner, side and interior locations of said spacer and have respective protrusions formed thereon which extend into cells so as to maintain said fuel rods received through said spacer cells in laterally spaced relationships, the improvement which comprises:

(a) a generally uniform poison coating within at least a majority of said fuel rods;

(b) a predetermined pattern of fuel enrichment with respect to said fuel rods of each mini-bundle thereof which together with said uniform poison coating within said fuel rods ensures that the packing powers of the fuel rods in said corner and side cells of said spacers are less than the peaking power of a leading one of said fuel rods in said interior cells of said spacers; and

(c) each of said fuel rods being received through said cells of said each spacer having a diametric size smaller than that of each of said fuel rods received through said side and interior cells of said each spacer, said diametric sizes of each of said fuel rods received through said side and interior cells of each spacer being generally equal.

4,708,846

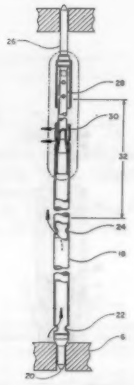
BWR CRITICAL-POWER-ENHANCING WATER ROD (85-EN-3)

John F. Patterson; Robert B. MacDuff, and Jack Yates, all of Richland, Wash., assignors to Exxon Nuclear Company, Inc., Bellevue, Wash.

Filed Apr. 10, 1986, Ser. No. 850,104

Int. Cl.[4] G21C *3/32*

U.S. Cl. 376—444 **11 Claims**



1. A fuel assembly for a boiling water reactor comprising a group of vertical, parallel, elongated fueld tubes containing a fissionable material, said assembly having a critical heat transfer zone in its upper portion; at least one water tube parallel to said fuel tubes and located among them, said water tube having an inlet adjacent its lower end; means closing the upper end of said water tube; an inner tube within the upper portion of said water tube having a lower end in sealing relationship with the inner surface of said water tube, forming an annulus with said water tube and having at least one opening adjacent its upper end; at least one upper exit opening in said water tube above the lower end of said inner tube and located within the critical heat transfer zone of said assembly, whereby water will flow upwardly through said water tube, upwardly through said inner tube, then downwardly through said water tube annulus and out through said upper exit opening, into the critical heat transfer zone of said assembly.

4,708,847

METHOD FOR ALLOYING SUBSTANCES

Tadashi Donomoto; Yoshiaki Tatematsu; Atsuo Tanaka, and Masahiro Kubo, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Continuation of Ser. No. 552,837, Nov. 17, 1983, abandoned. This application Jan. 17, 1986, Ser. No. 820,886

Claims priority, application Japan, Jul. 28, 1983, 58-138180

Int. Cl.[4] C22C *1/03, 33/04*

U.S. Cl. 420—129 **33 Claims**

1. A method for making an alloy of a first metallic material and a second metallic material which has a substantially lower melting point than the said first metallic material, comprising in the following specified order, the steps of:

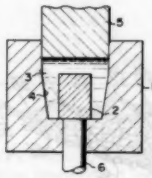
(a) forming from particles of the said first metallic material having average particle size of less than 100 microns a solid body which has multiple fine interstices therein, the said solid body being heated at a temperature above the melting point of the said second metallic material;

(b) pouring the said second metallic material, in a molten state and heated above its melting point, around the said body formed from the said first metallic material so that

the said body is directly submerged in a bath of the said molten metallic material; and,

(c) pressurizing the said bath of the said molten metallic material and allowing the resultant mass to cool under the application of the pressure;

(d) wherein the said heating of the said second metallic material above its melting point is sufficient so that the



heat supplied by the molten second metallic material is enough to alloy all of the said second metallic material which has entered into the said interstices of the said body with the said first metallic material forming the said body, whereby, in a part of the said resultant mass in which the said body formed from the said first metallic material was originally present, an alloyed mass comprising the first and the said second metallic alloyed together is made.

4,708,848

NICKEL/CHROME BASE SUPERALLOYS

Albert Lewis, Covina, Calif., assignor to Glass Incorporated International, Chino, Calif.

Filed Feb. 18, 1986, Ser. No. 830,010
Int. Cl.[4] C22C *30/00*
U.S. Cl. 420—585 **6 Claims**

1. High temperature, load-bearing oxidation resistant castings, said castings being fabricated from an alloy consisting essentially of:

ELEMEMTS	% BY WEIGHT
Chromium	24–27
Nickel	41–47
Columbium & Tantalum	1.0–1.9
Silicon	.75–1.5
Carbon	.10–.50
Manganese	less than 2.0
Tungsten	2.5–4.0
Molybdenum	2.5–4.0
Cobalt	2.5–4.0
Phosphorus	less than .03
Zirconium	0–0.30
Lead	less than 36 PPM
Nitrogen	less than 150 PPM
Tin	less than 25 PPM
Oxygen	less than 50 PPM
Copper	less than .50
Iron	Balance

wherein the alloy posseses high temperature stress rupture strength and oxidation resistance.

4,708,849

PROCESS FOR ENERGY STORAGE AND RECOVERY

Thaddeus J. Mielnik, Jr.; Kenneth J. Fisher, and Mahesh C. Aggarwal, all of Erie, Pa., assignors to American Sterilizer Company, Erie, Pa.

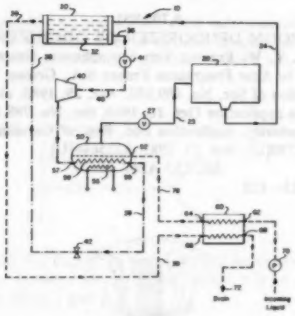
Filed Jul. 2, 1984, Ser. No. 627,069
Int. Cl.[4] A61L *2/06*
U.S. Cl. 422—26 **6 Claims**

1. In a method of using a system employing at least one liquid, a vapor and a fluid, the fluid being distinct from the at least one liquid and the vapor, and the system generating a total process heat, said system having at least one apparatus, wherein a vapor utilization phase is practiced, wherein the vapor in the at least one apparatus during the vapor utilization phase has a total initial process heat including its latent heat of vaporization and its sensible heat, the improvement including a process for recycling the latent heat of vaporization and the sensible heat from the vapor having the total initial process heat for subsequent use in the vapor utilization phase of the method, the improved process comprising:

channeling the vapor having substantially the total initial process heat from the at least one apparatus to a thermal storage unit;

absorbing the latent heat of vaporization from the vapor into a heat storing material for storage in the thermal storage unit so that the vapor condenses, yielding a first liquid having said sensible heat;

selectively transferring the latent heat of vaporization from the heat storing material to the fluid;



compressing the fluid after it has substantially received said latent heat of vaporization so that the fluid absorbs a first sufficient quantity of additional heat to raise the total heat content of the fluid above the total initial process heat;

selectively transferring said sensible heat from said first liquid to a second liquid;

transferring said latent heat of vaporization from the compressed fluid to said second liquid while transferring a second sufficient quantity of additional heat to said second liquid to yield a vapor having the total process heat;

expanding the compressed fluid after transfer of said latent heat of vaporization to said second liquid; and

selectively injecting the vapor having the total process heat into the at least one apparatus for use in the vapor utilization phase of the method practiced in the at least one apparatus.

4,708,850

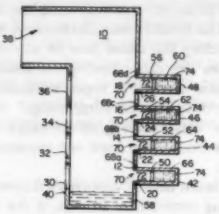
SELF-CONTAINED PORTABLE APPARATUS FOR BLOOD TYPING

Abbas Husain, 5 W. Chestnut Ave., Merchantville, N.J. 08109

Filed May 20, 1985, Ser. No. 735,616
Int. Cl.[4] G01N *33/49, 33/555;* **B01L** *3/00*
U.S. Cl. 422—61 **6 Claims**

1. In a testing apparatus for determining the blood group of a patient's blood sample, the combination of a receptacle member, a plurality of separately sealed ampulses each containing a distinct anti-serum, said ampules each being detachably joined to a distinct, and non-interchangeable separate site on the receptacle member, the receptacle member having a single chamber with an aperture through which the blood sample is admitted, each said ampule having a plenum sealed by a pane

having two faces, one of said faces being exposed to the antiserum in said ampule and the other said face being exposed to



the blood sample, and a separate means for opening each said plenum.

4,708,851

ROOM DEODORIZER OR ODORIZER

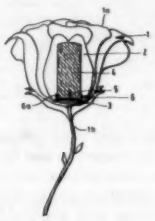
Andreas E. T. W. Freytag Von Loringhoven, Grasse, France, assignor to Azur Fragrances France S.A., Grasse, France

Continuation of Ser. No. 489,833, Apr. 29, 1983, abandoned. This application Oct. 16, 1985, Ser. No. 788,104

Claims priority, application Fed. Rep. of Germany, May 3, 1982, 8212730[U]; Sep. 11, 1982, 8225646[U]

Int. Cl.[4] A24F *25/00*

U.S. Cl. 422—123 **2 Claims**



1. A vapor releasing kit for releasing a vapor of a material into a room comprising:

a synthetic flower having:

a stem, and

an upwardly open petal structure defining an interior space open to the atmosphere and delimited from below by a base and laterally by an array of petals extending upwardly around said space from said base, said stem being attached to the exterior of said base and extending downwardly therefrom;

a rigid member fixed to said flower at said base and positioned within said interior space;

a single solid rigid pin upstanding from said member and extending into said space; and

a tampon disposed in said space and impregnated with a material in vaporizable liquid form engaged by said pin, said tampon comprising:

an elongated plug of a flexible, fibrous, bibulous material impregnated with said liquid,

a cap of synthetic resin material bonded to said plug at a lower end thereof and having a rim enclosing said lower end of said plug, said cap enabling said plug to be retained on the pin and being transfixed and pierced by said pin, said pin extending into said plug through said cap to removably retain said tampon on said member, and a disposable wrapping impermeable to vapors of said liquid and surrounding said tampon and capable of being removed prior to said tampon being disposed within said space.

4,708,852

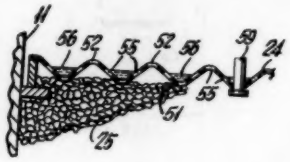
UNIFORM FLOW DISTRIBUTING MEANS FOR A TRICKLE BED FLOW REACTOR

Clements A. Helbling, Jr., and Robert M. Steinberg, both of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Apr. 8, 1985, Ser. No. 720,912

Int. Cl.[4] G05D *9/00*; B01J *8/02*

U.S. Cl. 422—220 **11 Claims**



1. In a catalytic reaction wherein a bed of solid catalyst particles has a liquid and gas mixture flow downward therethrough for said reaction,

a procedure for spreading said mixture uniformly throughout said catalyst bed, wherein the improvement comprises:

providing means for defining a plurality of pools of said liquid above said bed of catalyst under minimum rates of flow of said mixture, and

permitting flow of said gas through said means at positions located between said pools of liquid whereby said liquid and gas mixture is spread uniformly over said catalyst bed.

3. In a trickle bed flow reactor having a bed of solid catalyst particles for use in lube oil processes or the like,

wherein said flow includes both liquid and vapor flowing through said catalyst bed, the improvement comprising

means for distributing said liquid uniformly through said catalyst bed,

said distributing means comprising tray means having a plurality of depressions defined therein for holding a plurality of liquid pools above said catalyst bed when operated at a predetermined minimum rate of liquid flow, and

means for permitting vapor flow directly through said tray means at a plurality of positions located between said liquid pools.

4,708,853

MERCURY ADSORBENT CARBON MOLECULAR SIEVES AND PROCESS FOR REMOVING MERCURY VAPOR FROM GAS STREAMS

Thomas M. Matviya; Robert S. Gebhard, both of Pittsburgh, and Michael Greenbank, Monaca, all of Pa., assignors to Calgon Carbon Corporation, Pa.

Continuation of Ser. No. 548,472, Nov. 3, 1983, abandoned. This application Apr. 30, 1985, Ser. No. 729,010

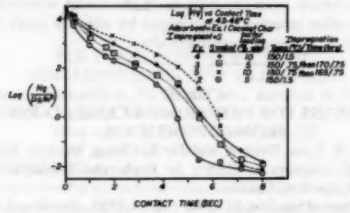
Int. Cl.[4] B01J *20/02*; B01D *19/00, 53/02*

U.S. Cl. 423—210 **12 Claims**

1. A carbon molecular sieve for removing mercury vapor from gas streams, having a nitrogen diffusivity of less than 2600×10^{-8} cm^2/second, impregnated with from about 0.005 to about 15%, by weight, of a mercury reactive material, wherein said carbon molecular sieve is effective at mercury vapor concentrations less than $4\times10^{-6}\times P_s$, where P_s is the mercury vapor saturation pressure at a given pressure and temperature.

7. A process for removing mercury vapor from gas streams which comprises passing a gas stream containing mercury vapor into contact with a carbon molecular sieve, having a nitrogen diffusivity of less than 2600×10^{-8} cm^2/second, impregnated with from about 0.005 to about 15 percent, by

weight, of a mercury reactive material, wherein said carbon molecular sieve is effective at mercury vapor concentrations



less than $4\times10^{-6}\times P_s$, where P_s is the mercury vapor saturation pressure at a given pressure and temperature.

4,708,854

PROCESS FOR THE REMOVAL OF NO FROM FLUID STREAMS USING A WATER-SOLUBLE POLYMERIC CHELATE OF A POLYVALENT METAL

Robert R. Grinstead, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 10, 1986, Ser. No. 837,927

Int. Cl.[4] **C01B** *21/00, 17/00;* **B01J** *8/00*

U.S. Cl. 423—235 **17 Claims**

1. A cyclic process for the removal of NO from a fluid stream comprising mixtures of NO and SO_2, which process comprises:

(A) contacting the fluid stream in a contacting zone with an aqueous reaction solution at a temperature between about 10° and 90° C., the reaction solution itself comprising an effective amount of an organic water-soluble polymeric chelate wherein the chelate contains a polyvalent metal to absorb the NO present, wherein the polymeric chelate has a molecular weight of between about 500 and 1,000,000, and a backbone repeating unit polymer chain having pendant organic chemical groups able to chelate the metal ion present; and

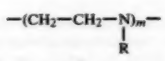
(B) separating the gas stream and the resulting aqueous phase produced in step (A) containing the polymeric chelate and imidodisulfonate;

(C) separating and purifying the aqueous solution produced in step (B) by membrane separation means effective to remove a portion of the water and other monomeric reaction products having a molecular weight of less than 500; and

(D) recycling the concentrated aqueous solution containing the water-soluble polymeric chelate of step (C) to the contacting zone of step (A).

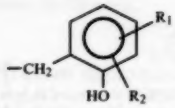
9. A process for the removal of NO from a fluid stream comprising mixtures of NO and SO_2, which process comprises:

(A) contacting the fluid stream in a contacting zone with an aqueous reaction solution at a temperature of between about 10° and 90° C., the reaction itself comprising an effective amount of a water-soluble organic polymeric chelate, containing a polyvalent metal to absorb the NO present, wherein the polymeric chelate has a molecular weight of between about 500 and 1,000,000 and pendant chelating groups is selected from chelates of the formula:

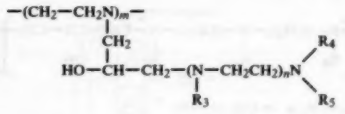


(a)

wherein R is $-CH_2COOH$, $-CH_2CH_2COOH$, $-CH_2-P(=O)(OH)_2$,

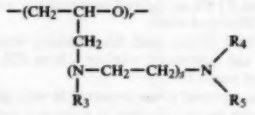


wherein R_1 and R_2 are independently $-CH_3$, $-SO_3H$, $-Cl$, $-H$, $-COOH$, and m is an integer between about 5 and 20,000;



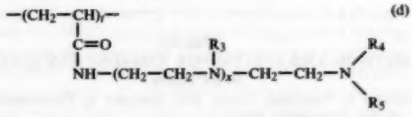
(b)

wherein R_3, R_4 and R_5 are each independently selected from R wherein R is as defined hereinabove, m is an integer between about 5 and 20,000; and n is 0, 1, 2, 3 or 4;



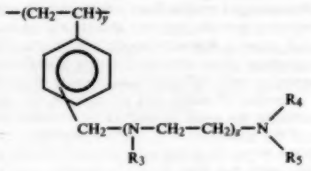
(c)

wherein R_3, R_4 and R_5 are as defined hereinabove; r is an integer between about 10 and 20,000, s is an integer between about 1 and 4;



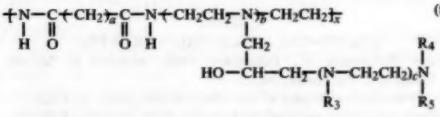
(d)

wherein R_3, R_4 and R_5 are as defined hereinbove; t is an integer between about 10 and 20,000 and x is an integer between about 1 and 4;



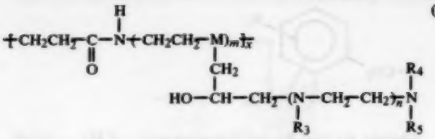
(e)

wherein R_3, R_4 and R_5 are as defined hereinabove, y is an integer between about 10 and 20,000; z is an integer between about 1 and 4;



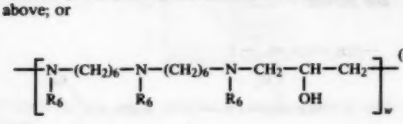
(f)

where R_3, R_4 and R_5 are as defined hereinabove, where x is between about 10 to 10,000, a is about 6, b is between about 1 and 4, and c is between about 1 and 4;



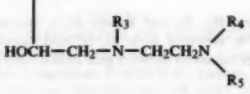
(g)

where m, x, n and R_3, R_4 and R_5 are as defined hereinabove; or



(h)

wherein R_6 is $-CH_2$ or $-H$;



wherein R_3, R_4 and R_5 are as defined hereinabove; and w is between about 2000 and 4000;

(B) separating the fluid stream and the resulting aqueous phase containing the polymeric chelate . iron (II) and imidodisulfonate of step (A);

(C) concentrating the aqueous phase repeated in step (B) by membrane separation means effective to remove a portion of the water and other monomeric reaction products having a molecular weight below 500 and;

(D) recycling the concentrated aqueous solution containing the water soluble polymeric chelate produced in step (C) to the contacting zone of step (A).

4,708,855

METHOD AND SYSTEM FOR EXHAUST GAS STREAM SCRUBBING

Garrett L. Morrison, Unity, Me., assignor to Passanaquoddy Tribe, Thomaston, Me.

Continuation-in-part of Ser. No. 796,075, Nov. 7, 1985, abandoned. This application Jul. 25, 1986, Ser. No. 890,991

Int. Cl.[4] C01B *21/00, 17/00;* **C04B** *9/02;* **B01D** *50/00*

U.S. Cl. 423—235 **4 Claims**

1. The method of scrubbing an exhaust gas stream containing sulfur oxides and nitrogen oxides from a wet process cement kiln which comprises introducing into the stream as it exits from the kiln and enters a downstream dust collector a finely divided mist comprised of an aqueous solution of highly soluble alkaline material in only sufficient quantity in relation to the concentration of oxides of sulfur and nitrogen in the stream instantly to neutralize the acids formed by the reaction of the water content of the mist therewith while completely evaporating said solution to produce dry solid particulate salts capable of collection with the dust in said collector, and while causing minimal cooling of the exhaust stream, said aqueous solution being derived from leaching of principally potassium containing alkali material from waste dust produced by cement making.

4,708,856

LIQUID-GAS ABSORPTION PROCESS

Frank Rukovena, Jr., Tallmadge, Ohio, assignor to Norton Company, Worcester, Mass.

Continuation-in-part of Ser. No. 835,842, Mar. 3, 1986, abandoned. This application Aug. 22, 1986, Ser. No. 899,706

Int. Cl.[4] C01B *17/00*

U.S. Cl. 423—242 **7 Claims**

1. A method of removing SO_2 from a gas stream comprising passing said gas stream to the bottom of a packed tower and feeding aqueous sulfite solution to the top of the tower at a rate of 0.05 to 1.0 gallons/minute-square foot, withdrawing gas depleted in SO_2 from the top of the tower and withdrawing bisulfite solution from the bottom of the tower wherein the aqueous sulfite solution is distributed by either a spray type distributor or a trough type distributor.

4,708,857

PROCESS FOR PREPARING A CRYSTALLINE IRON-BOROSILICATE

Kee K. L. S. Leen, Ottawa, and Jin R. Chang, Ste-Foy, both of Canada, assignors to Centre de Recherche Industrielle du Quebec, Quebec, Canada

Continuation of Ser. No. 517,396, Jul. 26, 1983, abandoned. This application Sep. 22, 1986, Ser. No. 910,305

Int. Cl.[4] C01B *35/10*

U.S. Cl. 423—277 **4 Claims**

1. The method of preparing a crystalline ironborosilicate zeolitic material having a composition in terms of mole ratios of oxides as follows:

$$1.0\pm0.3M_{n/2}O:(a\ Fe_2O_3:b\ B_2O_3):y\ SiO_2:z\ H_2O$$

wherein M is at least one cation of valence n selected from the group consisting of alkylammonium cation, hydrogen cation, a metal cation and mixtures thereof; a is equal to or greater than 0.05 and b is equal to or greater than 0.05 such that $a+b=1$; y has a value between 6 and 500 and z has a value between zero and 50, said material providing an X-Ray diffraction pattern comprising the following diffraction lines and assigned strengths

Interplanar spacings, d (Å)	Relative Intensity
11.2 ± 0.2	w–s
10.05 ± 0.2	w–ms
9.05 ± 0.15	vw
7.50 ± 0.15	w
7.13 ± 0.15	vw
6.71 ± 0.15	vw
6.40 ± 0.15	w
6.04 ± 0.1	w
5.7 ± 0.1	w
5.60 ± 0.1	w
5.13 ± 0.1	vw
5.00 ± 0.1	w
4.62 ± 0.08	w
4.26 ± 0.08	w
4.02 ± 0.08	w
3.83 ± 0.05	vs
3.71 ± 0.05	s
3.65 ± 0.05	m–s
3.43 ± 0.05	w
3.33 ± 0.05	w
3.26 ± 0.05	vw
3.05 ± 0.05	w
2.99 ± 0.02	w
2.86 ± 0.02	vw
2.78 ± 0.02	vw
2.73 ± 0.02	vw
2.61 ± 0.02	vw
2.49 ± 0.02	w
2.39 ± 0.02	vw
2.00 ± 0.02	w–m
1.95 ± 0.02	vw
1.91 ± 0.02	vw
1.87 ± 0.02	vw
1.76 ± 0.02	vw
1.66 ± 0.02	vw

which comprises reacting together in aqueous solution an iron salt, alkali metal tetrahydroborate, a silicon-containing material, an alkali or alkaline earth metal hydroxide, an alkylammonium cation or precursor thereof and sodium chloride as a mineralization agent, the reaction mixture being maintained at alkaline pH of about 9 to 13.5 and at a temperature between

25° C. and 300° C. for a time sufficient to effect crystallization of the iron-borosilicate under autogenous pressure at the reaction temperature.

4,708,858

POLYMERIZATION OF CYCLIC DIHALOPHOSPHAZENE OLIGOMERS

Charles C. Kirkpatrick, St. Louis, Mo., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 17, 1985, Ser. No. 724,215
Int. Cl.[4] C01B *25/10*
U.S. Cl. 423—300 16 Claims

1. A process for the polymerization of cyclic dihalophosphazene oligomer to form linear polydihalophosphazene which comprises:

(a) agitating under an inert gaseous atmosphere a mixture containing at least one cyclic dihalophosphazene, a polar organic solvent for said cyclic halophosphazene, a catalytic amount of a solid catalyst comprising a solid support of silica or alumina containing supported thereon a transition metal compound and an organometallic compound wherein at least a portion of the transition compound has a valence of +3 or lower, said mixture being maintained at a temperature of from about 150° to about 250° C. for a sufficient period of time to form polydihalophosphazene, and

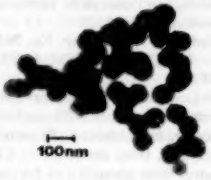
(b) recovering polydihalophosphazene.

4,708,859

SILICA WITH A HIGH OIL ABSORPTION CAPABILITY AND A CONTROLLED PRIMARY STRUCTURE AND PROCESS FOR THE PRODUCTION THEREOF

Yvonick Chevallier, Decines, France, assignor to Rhone-Poulenc Chimie, France

Continuation of Ser. No. 753,874, Jul. 11, 1985, abandoned. This application Jun. 24, 1986, Ser. No. 879,492
Claims priority, application France, Jul. 11, 1984, 84 11004
Int. Cl.[4] C01B *33/18, 33/12*
U.S. Cl. 423—339 15 Claims



1. A process for the production of precipitated silica comprising:

(a) providing a colloid of silica by

(i) forming a reaction medium by simultaneously adding an acidifying agent and an alkaline silicate solution to a reaction vessel;

(ii) reacting said acidifying agent and said alkaline silicate solution; and

(iii) maintaining a constant volume of said reaction medium by drawing off said reaction medium while adding additional acidifying agent and alkaline silicate solution in a constant volume to the reaction medium, wherein said alkaline silicate is added to said reaction medium to provide a silica concentration that avoids aqqlomeration of colloidal particles;

(b) reacting at least a portion of the colloid obtained in step (a) with an electrolyte, said colloid having a mean diameter of between about 10 and 100 nm and a polydisperity factor of from about 1 to 4; and

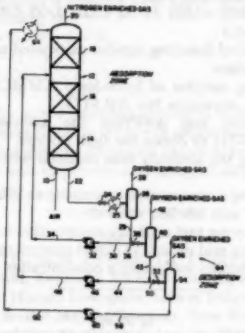
(c) consolidating the substance obtained in step (b) by adding a solution of silicate and an acidifying agent to obtain said precipitated silica with a CTAB specific surface area from about 20–120 m^2/g.

4,708,860

SPLIT-FLOW REGENERATION IN ABSORPTIVE AIR SEPARATION

Robert F. Weimer, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Dec. 29, 1986, Ser. No. 947,165
Int. Cl.[4] C01B *13/00*
U.S. Cl. 423—579 10 Claims



1. In a continuous chemical process for separating oxygen from air in which elevated pressure air is contacted in an absorption zone with an oxygen acceptor which becomes oxidized, the oxidized oxygen acceptor is separately decomposed by at least one of the actions of pressure reduction or supplying heat or contacting with a stripping gas in a desorption zone to yield an oxygen product and regenerated oxygen acceptor and the regenerated oxygen acceptor is recycled to the absorption zone, characterized in that said air is contacted in each of a plurality of seriesconnected stages of the absorption zone with at least a portion of freshly regenerated oxygen acceptor and the resulting oxidized oxygen acceptor from said absorption zone is regenerated in a plurality of series-connected stages of the desorption zones in which after each said stage of the desorption zone only a portion of the regenerated oxygen acceptor is recycled to a corresponding stage of said plurality of series-connected stages of the absorption zone and the remaining regenerated oxygen acceptor is further regenerated in a subsequent stage of the desorption zone until the final stage of the desorption zone after which all of the regenerated oxygen acceptor from that stage is recycled to its corresponding stage of the absorption zone.

4,708,861

LIPOSOME-GEL COMPOSITIONS

Mircea C. Popescu; Alan L. Weiner, both of Plainsboro, and Sharon S. Carpenter-Green, East Windsor, all of N.J., assignors to The Liposome Company, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 580,212, Feb. 15, 1984, abandoned. This application Jan. 31, 1985, Ser. No. 695,887
Int. Cl.[4] A61K *43/00, 49/00*
U.S. Cl. 424—1.1 78 Claims

1. A liposome-gel composition comprising a bioactive agent entrapped in liposomes sequestered in a gel matrix in which:

(a) the gel matrix has a pore size relative to the liposomes so that the liposomes are sequestered in the gel matrix without blocking (i) diffusion of fluids into the gel which interact with bilayers of the liposomes, (ii) the ability of the sequestered liposomes to release the entrapped bioactive agent or (iii) the diffusion of the bioactive agent re-

leased from the liposomes through the gel to the surrounding environment; and

(b) the gel matrix is capable of forming or remaining gelled at temperatures and conditions of the environment in which it is administered or applied.

4,708,862

RADIOIMMUNO DETECTION OF HUMAN CANCERS USING ANTI-TUMOR MONOCLONAL ANTIBODY

Robert W. Baldwin, Long Eaton, United Kingdom, assignor to Xoma Corporation, Berkeley, Calif.

Continuation of Ser. No. 468,193, Feb. 22, 1983, abandoned. This application Jun. 17, 1986, Ser. No. 875,256

Int. Cl.[4] A61K *43/00, 39/00;* **C12N** *5/00;* **G01N** *33/577*

U.S. Cl. 424—1.1 **7 Claims**

1. A method of detecting tumour associated antigens which method comprises:

(i) preparing samples of hybridoma XMMCO-791 having A.T.C.C. Accession No. HB 9173,

(ii) separating and purifying the associated antibody XMMCO-791 to obtain the Ig2b isotype,

(iii) labelling the antibody thus obtained with a radioactive label,

(iv) preparing a composition containing an effective concentration of said labelled antibody,

(v) administering said antibody composition to a patient, and

(vi) screening said patient to detect concentrations of radioactivity thereby indicating a concentration of antibody.

4,708,863

DEODORANT COMPOSITIONS

Brian Bews, Isleworth; Peter Critchley, Camberley; James A. Durrant, Bedfont; Malcolm R. D. Stebles, Maidenhead, and Leigh R. H. Tipping, Twichenham, all of England, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 175,233, Aug. 5, 1980, abandoned. This application Aug. 3, 1981, Ser. No. 289,601

Claims priority, application United Kingdom, Aug. 10, 1979, 7927924; Aug. 10, 1979, 7927922

Int. Cl.[4] A61K *7/32, 7/36, 7/39, 9/12*

U.S. Cl. 424—47 **6 Claims**

1. A process for inhibiting axillary odour comprising applying to an axilla a deodorant composition comprising a suspension of an effective amount of a particulate deodorant active material in a physiologically acceptable carrier liquid or gel medium containing less than 80% water by weight of the carrier medium, wherein said deodorant active ingredient is zinc carbonate, other astringent salts being absent.

4,708,864

METHOD AND COMPOSITIONS FOR TREATING DENTAL STRUCTURES

Gerald L. Maurer, Cincinnati, Ohio, assignor to National Research Laboratories, Cincinnati, Ohio

Continuation-in-part of Ser. No. 681,565, Dec. 14, 1984, Pat. No. 4,652,444. This application Mar. 20, 1987, Ser. No. 28,552

Int. Cl.[4] A61K *7/16, 31/28, 31/30*

U.S. Cl. 424—49 **26 Claims**

1. A dental composition for treating a dental disorder including bad breath, caries, dental structure degradation, calculus accumulation and plaque formation, said dental composition comprises

a monometal complex comprised of a multivalent heavy metal ion and a polyfunctional organic ligand in a ratio of 1:1 the metal ion to the ligand selected from a group consisting of an organic acid and a substituted organic acid, the complex having an aqueous proton induced dissociation property represented by a sigmoidally-shaped curve on a cartesian coordinate plot of the negative log of the metal ion concentration versus the negative log of the hydrogen ion concentration, and

a pharmaceutically acceptable aqueous vehicle for said active ingredient wherein said dental composition is adapted to be applied in an effective amount to a dental structure to release said metal ions in a pH range of from about 4 to about 9 to treat the dental disorder.

4,708,865

METHOD AND COMPOSITION FOR ARTIFICIALLY TANNING THE HUMAN EPIDERMIS

Janet N. Turner, Route Box 195, Warsaw MO.

Filed Aug. 21, 1986, Ser. No. 898,645

Int. Cl.[4] A61K *7/42*

U.S. Cl. 424—59 **6 Claims**

1. A topical solution for artificially tanning the human skin comprising a blend of essentially equal volumes of filtered mixtures of:

(a) a cutch powder containing mixture consisting of for every 1 part by volume alcohol, about 2 parts by volume water and about 2 parts by volume of 4 wt. % $AlK(SO_4)_2$ dissolved in 0.85 wt. % saline solution to which has been added at least 4 grams of cutch powder per 100 parts total volume;

(b) a logwood powder containing mixture consisting of for every 1 part by volume alcohol, about 2 parts by volume water and about 2 parts by volume of 4 wt. % $AlK(SO_4)_2$ dissolved in 0.8 wt. % saline solution to which has been added at least 4 grams of logwood powder per 100 parts total volume; and

(c) a walnut powder containing mixture consisting of for every 1 part by volume alcohol, about 2 parts by volume water and about 2 parts by volume of 4 wt. % $AlK(SO_4)_2$ dissolved in 0.85 wt. % saline solution to which has been added at least 6 grams of walnut powder per 100 parts total volume, and

an equal volume of a solution consisting of for every 1 part by volume alcohol, about 2 parts by volume of 5 wt. % sorbitol dissolved in water and sufficient dihydroxyacetone to produce at least a 3 wt. % up to about 10 wt. % final concentration in said resulting topical solution.

4,708,866

ARTIFICIAL NAIL COMPOSITION

Josephine M. Turco, and Deborah A. Turco, both of 13 Bluebird La., West Amherst, N.Y. 14228

Filed Aug. 9, 1985, Ser. No. 764,122

Int. Cl.[4] A61K *7/04, 31/78*

U.S. Cl. 424—61 **6 Claims**

1. An artificial nail composition for coating human nails comprising in combination from 5–50 parts of a lower alkylmethacrylate monomer, from about 5–50 parts of a lower alkylmethacrylate polymer, from about 0.1 to 5.0 parts of a polymerization initiator, from about 0.1 to 5.0 parts of a polymerization accelerator, from about 2.0 to 30 parts of a calcium composition, and from about 2.0 to 50 parts of lanolin, said lower alkylmethacrylates selected from the group consisting of methyl, ethyl, butyl methacrylates and mixtures thereof, said calcium composition selected from the group consisting of calcium, calcium carbonate and mixtures thereof.

4,708,867

MINIPELLETS

Charles H. Hsiao, Cooper City, Fla., assignor to Key Pharmaceuticals, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 564,852, Dec. 19, 1983, abandoned. This application Mar. 8, 1984, Ser. No. 587,536

Int. Cl.[4] A61K *9/28, 9/32, 9/58*

U.S. Cl. 424—80 **5 Claims**

1. A minipellet dosage form of prednisone or prednisolone, resistant to attack by saliva but readily dissolvable in gastric juice, consisting essentially of a nonpareil seed having coated thereon a first layer comprising a mixture of a prednisone or prednisolone and polyvinylpyrrolidone and a second layer of dimethylaminoethyl and methyl methacrylate copolymer, the

minipellet being substantially dissolved in 30 minutes on contact with gastric juice.

4,708,868

ORAL ANTI-DIABETIC PHARMACEUTICAL FORMS AND THE PREPARATION THEREOF

Rolf Brickl, Warthausen; Gottfried Schepky, Biberach; Eckhard Rupprecht, Aulendorf-Tannhausen, and Andreas Greischel, Biberach, all of Fed. Rep. of Germany, assignors to Dr. Karl Thomae GmbH, Biberach an der Riss, Fed. Rep. of Germany

Filed May 31, 1984, Ser. No. 616,010

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1983, 3320583

Int. Cl.[4] A61K *31/79, 31/745, 31/495, 31/47*

U.S. Cl. 924—80 **16 Claims**

1. The method of preparing an oral antidiabetic pharmaceutical composition containing an antidiabetic sulfonyl urea as the active ingredient, which comprises dissolving or emulsifying

(a) an acid antidiabetic sulfonyl urea with a basic excipient, or

(b) an amphoteric antidiabetic sulfonyl urea with a basic or acid excipient, or

(c) a basic antidiabetic sulfonyl urea with an acid excipient

in an inert polar solvent in the presence of at least one solubilizing or emulsifying substance, where the molar ratio of sulfonyl urea to basic or acid excipient is less than 1:1 and the ratio of sulfonyl urea to the total of solubilizing or emulsifying substance is from about 1:0.5 to 1:10 parts by weight, applying the resulting solution or emulsion to the surface of at least one water-insoluble carrier, where the ratio of sulfonyl urea to the total of water-insoluble carrier is from 1:1 to 1:12 parts by weight, and drying the thus treated water-insoluble carrier.

4,708,869

PERSISTENT INCAPACITATING CHEMICAL WARFARE COMPOSITION AND ITS USE

Abraham Koblin, Baltimore, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 2, 1969, Ser. No. 855,078

Int. Cl.[4] A61K *31/66, 31/78*

U.S. Cl. 424—81 **6 Claims**

1. A persistent incapacitating composition for chemical warfare on land containing 100 parts by weight of at least one chemical warfare nerve agent or blistering agent, about 0.5 to 8 parts by weight of a synthetic polymeric thickener for said agent, and about 0.5 to 10 parts by weight of a synthetic multicellular polymer.

4,708,870

METHOD FOR IMPARTING ANTIMICROBIAL ACTIVITY FROM ACRYLICS

Steven P. Pardini, Columbia, S.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 3, 1985, Ser. No. 740,896

Int. Cl.[4] A61K *31/78, 31/74;* **A61B** *17/04;* **A61L** *17/00*

U.S. Cl. 424—81 **23 Claims**

1. A method for imparting non-fugitive antimicrobial activity, effective in reducing viable microorganisms, exhibiting a shake flask percent reduction of Klebsiella of 70 to 100% to an article of manufacture comprising the steps of forming said article of manufacture from a polymeric acrylonitrile composition of:

a. at least 85% by weight acrylonitrile.

b. up to about 13% by weight of a neutral ethylenically unsaturated monomer, and

c. from about 0.1 to 10% by weight of a protonated amine containing compound

where said antimicrobial activity is inherent in the acrylonitrile composition.

4,708,871

ANTIGENICALLY ACTIVE AMINO ACID SEQUENCES

Hendrik Geysen, Knoxfield, Australia, assignor to Commonwealth Serum Laboratories Commission, Parkville, Australia

PCT No. PCT/AU84/00038, § 371 Date Nov. 8, 1984, § 102(e) Date Nov. 8, 1984, PCT Pub. No. WO84/03506, PCT Pub. Date Sep. 13, 1984

PCT Filed Mar. 8, 1984, Ser. No. 674,907

Claims priority, application Australia, Mar. 8, 1983, PF8347

Int. Cl.[4] A61K *39/00;* **C07K** *7/06;* **G01N** *53/00*

U.S. Cl. 424—88 **18 Claims**

1. A synthetic peptide which displays the antigenicity of the VP1 protein of foot-and-mouth disease virus, Type O_1, wherein said peptide is selected from amino acid sequences of the group consisting of:

(i) G - D - L - Q - V - L - A;

(ii) G - D - L - Q - V - L;

(iii) D - L - Q - V - L - A;

(iv) D - L - Q - V - L; and

(v) antigenically acitve modified sequences based on any one of the sequences (i) to (iv) above in which one of the amino acids in said sequences (i) to (iv) above is replaced by another amino acid to provide said antigenically active modified sequences.

4,708,872

ANTITUMOR ANTIBIOTIC COMPLEX

Masataka Konishi, Kawasaki; Kyoichiro Saitoh, Zushi; Hiroaki Ohkuma, and Hiroshi Kawaguchi, both of Tokyo, all of Japan, assignors to Bristol-Meyers Company, New York, N.Y.

Continuation of Ser. No. 768,764, Aug. 25, 1985, which is a continuation of Ser. No. 601,181, Apr. 20, 1984, which is a continuation-in-part of Ser. No. 495,231, May 16, 1983, abandoned. This application Dec. 23, 1985, Ser. No. 812,699

Int. Cl.[4] A61K *35/74;* **C12P** *1/04*

U.S. Cl. 424—115 **2 Claims**

1. The antitumor antibiotic BBM-1675B_1 which:

(a) is soluble in chloroform, ethyl acetate, acetone, ethaol and methanol, slightly soluble in benzene and water, and insoluble in n-hexane and carbon tetrachloride;

(b) give a positive reaction with ferric chloride, Ehrlich and Tollen's reagents and a negative reaction in Sakaguchi, ninhydrin and anthrone tests;

(c) has a melting point in the range of about 159°–161° C.;

(d) has an optical rotation of $[\alpha]_D^{27} - 171°$ (c 0.5, $CHCl_3$);

(e) exhibits in silica gel thin layer chromatography an Rf value of 0.63 with the solvent system $CHCl_3$—CH_3OH (5:1 v/v) and exhibits in reverse phase silica gel thin layer chromatography an Rf value of 0.23 with the solvent system CH_3CN—H_2O (75:25 v/v);

(f) exhibits the following ultraviolet absorption maxima when dissolved in methanol, 0.01N HCl—CH_3OH and 0.01N NaOH—CH_3OH

UV λ_{max} nm ($E_{1\ cm}^{1\%}$) in methanol:
253 (225)
282 (140)
320 (104)

UV λ_{max} nm ($E_{1\ cm}^{1\%}$) in 0.01N HCl—CH_3OH:
253 (225)
282 (140)
320 (105)

UV λ_{max} nm ($E_{1\ cm}^{1\%}$) in 0.01N NaOH—CH_3OH:
252 (236)
283 (141)
318 (105);

(g) is effective in inhibiting the growth of various bacteria and fungi; and

(h) induces prophage in lysogenic bacteria; said antibiotic being obtained by cultivating a BBM-1675B_1-producing strain of *Actinomodura verrucosospora* selected from *Actinomadura verrucosospora* strain H964-92 (ATCC 39334), *Actinomadura verrucosospora* strain A1327Y (ATCC 39638), or a BBM-1675B_1-producing mutant thereof, in an

aqueous nutrient medium containing assimilable sources of carbon and nitrogen under submerged aerobic conditions until a substantial amount of BBM-1675B_1 is produced by said organism in said culture medium and then recovering BBM-1675B_1 from the culture medium by conventional chromatographic procedures.

4,708,873

METHOD OF CHEMICALLY DEBRIDING UNCERATED NECROTIC TISSUE

Thomas L. Schulte, 218 Family Farm Dr., Woodside, Calif. 94062

Filed Jan. 29, 1986, Ser. No. 823,852
Int. Cl.[4] A61K *35/78, 31/615*
U.S. Cl. 424—195.1 **11 Claims**

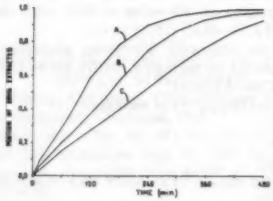
1. A method for promoting the healing of an abnormal, ulcerated necrotic tissue or skin mucous membrane of a patient which comprises applying topically to the affected area of the patient an amount of biphenamine, as an aqueous mixture comprising a pharmaceutically acceptable carrier, effective to promote debridement of necrotic tissue from the affected area, thereby promoting the healing of the affected area, and also applying topically to the affected area sequentially or in admixture therewith an amount of the juice of the aloe vera plant effective to further promote wound healing.

4,708,874

DEVICES FOR THE CONTROLLED RELEASE OF ACTIVE SUBSTANCES, AS WELL AS PROCESS FOR THE PREPARATION THEREOF

Pieter De Haan, Groningen; Coenraad F. Lerk, Peize, and Adelbert J. M. Schoonen, Groningen, all of Netherlands, assignors to Rijksuniversiteit Groningen, Groningen, Netherlands

Filed Mar. 10, 1986, Ser. No. 838,248
Claims priority, application Netherlands, Mar. 13, 1985, 8500724
Int. Cl.[4] A61K *9/52*
U.S. Cl. 424—470 **33 Claims**



1. A shaped article for the controlled release of at least one active ingredient to a liquid, comprising:

(a) a restraining phase granulate comprising at least one active ingredient dispersed in a matrix comprising at least one material insoluble in the liquid; and

(b) a housing phase granulate comprising a material soluble in the liquid and a penetration rate limiting material;

said shaped article formed by compressing a mixture of particles of size about 0.4 to 2 mm, of said restraining phase granulate and said housing phase granulate in a weight ratio of 30:70 to 70:30 to form a shaped article in which both restraining and housing phases are substantially continuous.

4,708,875

PRODUCTION OF FERMENTED ALCOHOLIC PRODUCTS HAVING A LOW DIACETYL CONTENT

Sven E. Godtfredsen, Kirke Vaerlose; Martin Ottesen, Valby, and Bent A. Larsen, Charlottenlund, all of Denmark, assignors to De Forenede Bryggerier A/S, Copenhagen, Denmark

PCT No. PCT/DK81/00076, § 371 Date Mar. 15, 1982, § 102(e) Date Mar. 15, 1982, PCT Pub. No. WO82/00474, PCT Pub. Date Feb. 18, 1982
PCT Filed Aug. 6, 1981, Ser. No. 361,930
Claims priority, application Denmark, Aug. 7, 1980, 3398/80
Int. Cl.[4] C12C *11/00;* **C12G** *1/00;* **C12N** *11/16*
U.S. Cl. 426—12 **11 Claims**

1. A process for producing fermented alcoholic products with a low diacetyl content comprising fermenting a carbohydrate-containing substrate with a microorganism in a main fermentation and treating said substrate during or after said main fermentation with an acetolactate converting enzyme.

4,708,876

METHOD FOR PREPARING CHEESE FLAVOR CONCENTRATE

Hitoshi Yokoyama, and Yukiya Iwanaga, both of Osaka, Japan, assignors to Fuji Oil Company, Limited, Osaka, Japan

Filed Apr. 22, 1986, Ser. No. 854,743
Claims priority, application Japan, Apr. 22, 1985, 60-86019
Int. Cl.[4] A23L *1/23*
U.S. Cl. 426—33 **6 Claims**

1. A method for preparing a cheese flavor concentrate which comprises the steps of:

providing an emulsion comprising 2 to 30% by weight of fat or oil containing butyric acid as an essential constituent fatty acid, 2 to 30% by weight of a protein, 0.1 to about 1% by weight of lactic bacterial assimilable saccharide and not less than 50% by weight of water, said fat or oil being an interesterified fat or oil containing 0.5 to 15% by weight of butyric acid and not more than 2% by weight of C_{12} acid based on the total constituent fatty acids,

adding a lipolytic enzyme and a proteolytic enzyme and lactic bacteria to the emulsion system in amounts sufficient to impart a cheese flavor to the concentrate, and

subjecting the resulting mixture to aging for 0.5 to 7 days.

4,708,877

ANIMAL FEED BLOCKS CONTAINING DIETARY SUPPLEMENTS

Dennis Donovan, Decatur, Ill.; Michael L. McDonnell, Lincoln; Gerald C. Weigel, Fremont, both of Nebr., and John E. Long, Cedar Rapids, Iowa, assignors to Archer Daniels Midland Company, Decatur, Ill.

Continuation of Ser. No. 626,489, Jul. 5, 1984, abandoned, which is a continuation-in-part of Ser. No. 543,347, Oct. 19, 1983, abandoned. This application Apr. 17, 1986, Ser. No. 854,071
Int. Cl.[4] A23K *1/22*
U.S. Cl. 426—69 **5 Claims**

1. A process for forming a solid animal feed block consisting essentially of adding to a single mixer ingredients of said solid block in the following sequence:

(a) adding to said mixer 20–60% by weight molasses and 0–20% water,

(b) adding to (a) 1–5% by weight of attapulgite clay to produce a suspension;

(c) adding to (b) 4–6% by weight of urea;

(d) adding to (c) 0–20% by weight of animal fat;

(e) adding to (d) 0–10% by weight calcium carbonate and 1–15% by weight salt;

(f) adding to (e) 0–2% by weight calcium sulfate; and 0.5% to 10% by weight of vitamin and mineral feed supplements;

(g) adding as the next to last ingredient 4–6% by weight magnesium oxide;

(h) adding to (g) in any order 2.5%–30% by weight corn

steep liquor; 0–50% by weight corn gluten feed; 0–40% by weight corn gluten meal; and 0–14% by weight cottonseed meal;

(i) after (h), mixing until the temperature of the mixture reaches a temperature of 140°–175° F., and then transferring the mixture from said mixer into containers to harden.

4,708,878

PROCESS FOR TEMPERATURE CONTROLLING A LIQUID

Ulrich Hagelauer, Magirusstrasse 23, Stuttgart, and Uwe Faust, Relenbergstrasse 57, Stuttgart 1, both of Fed. Rep. of Germany

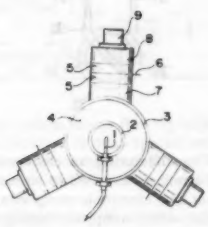
PCT No. PCT/DE84/00132, § 371 Date Jun. 17, 1985, § 102(e) Date Jun. 17, 1985, PCT Pub. No. WO85/00420, PCT Pub. Date Jan. 31, 1985

PCT Filed Jun. 12, 1984, Ser. No. 719,283

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1983, 3325195

Int. Cl.[4] G01N *33/02;* **A23L** *3/00*

U.S. Cl. 426—231 **11 Claims**



1. A process for controlling the temperature of a liquid comprising:

providing acoustic ultrasonic wave generating means, responsive to a control signal, for generating acoustic ultrasonic waves to substantially homogeneously heat a liquid;

irradiating at least a portion of said liquid with acoustic ultrasonic waves from said acoustic ultrasonic wave generating means to substantially homogeneously heat said at least a portion of said liquid;

providing temperature sensing means for measuring the temperature of said heated liquid;

measuring the temperature of said heated liquid with said temperature sensing means to obtain an actual temperature of said liquid;

providing electronic control means, operably connected to said acoustic ultrasonic wave generating means and said temperature sensing means, for comparing said actual temperature of said heated liquid with a predetermined desired temperature of said heated liquid and producing a control signal based on said comparison;

comparing said actual temperature of said heated liquid with a predetermined desired temperature of said heated liquid and producing a control signal based on said comparison;

feeding said control signal to said acoustic ultrasonic wave generating means.

4,708,879

USE OF METAM SODIUM FOR PRESERVING HAY

Neil M. Huber, Bellevue, Wash., assignor to Bio Techniques Laboratories, Inc., Redmond, Wash.

Filed Feb. 11, 1986, Ser. No. 828,495

Int. Cl.[4] A23K *3/00*

U.S. Cl. 426—335 **6 Claims**

1. A method of stabilizing a high-moisture hay crop comprising less than about 35 percent by weight moisture against microbial degradation, comprising the step of spraying said hay immediately prior to baling with an amount of a composition effective to retard microbial degradation and thereby stabilize said hay crop, said composition consisting essentially of sodium methyl dithiocarbamate and said stabilizingly effective amount comprising no more than about 4 pounds of sodium methyl dithiocarbamate per wet ton of said hay crop.

4,708,880

ESSENTIAL OILS TREATED TO REMOVE HARSH NOTES THEREFROM

Mamoun M. Hussein, Mountain Lakes, N.J., assignor to Nabisco Brands, Inc., Parsippany, N.J.

Continuation-in-part of Ser. No. 727,646, Apr. 26, 1985, abandoned. This application Jul. 29, 1986, Ser. No. 891,722

Int. Cl.[4] C11B *9/00*

U.S. Cl. 426—424 **6 Claims**

1. A process for removing harsh flavor off-notes from the distilled essential oil of a botanical material selected from mentha which comprises extracting said oil, in a liquid-liquid extraction process, with such amounts of aqueous acidified oxidizing agent as are sufficient to remove at least substantially all of said harsh flavor notes present in said oil, said acidified oxidizing agent being formed from a water soluble inorganic acid and an oxidizing agent which is selected from the group consisting of hydrogen peroxide, ozone and mixtures thereof.

4,708,881

METHOD FOR PRODUCING FROZEN FOODS

Mineyasu Ishikuma, Kanagawa; Hiroshi Hasui, Takamatsu, and Toshiyuki Ono, Kagawa, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Feb. 6, 1986, Ser. No. 826,904

Claims priority, application Japan, Feb. 13, 1985, 24409/1985

Int. Cl.[4] A23L *3/36*

U.S. Cl. 426—524 **4 Claims**

1. In a method for producing a frozen cream food, which comprises at least two freezing steps, the improvement which comprises:

(a) freezing the cream food at a temperature in the range of 0° to −5° C., at which the maximum crystallization of ice occurs;

(b) subjecting the frozen cream food to a coating, heating or frying operation to form a processed food;

(c) freezing the processed food at a temperature of not higher than −10° C.

4,708,882

METHOD FOR DETECTING FINGERPRINTS USING A LASER AND AN APPARATUS THEREFOR

Yuichiro Asano; Yoshihisa Kono; Takayuki Yanagimoto; Motoji Shiozumi; Kunio Takahashi; Akira Torao, all of Chiba; Susumu Moriya, and Atsushi Momose, both of Hyogo, all of Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan

Filed Dec. 19, 1985, Ser. No. 810,988

Claims priority, application Japan, Dec. 27, 1984, 59-280888; Dec. 27, 1984, 59-280889; Apr. 17, 1985, 60-82003

Int. Cl.[4] A61B *5/10*

U.S. Cl. 427—1 **1 Claim**

1. A method for the detection of a latent fingerprint on a sample by the deposition of a fluorescent dye or a chemical reagent capable of producing a fluorescent substance by the reaction with the ingredients in the fingerprint secretion on to a surface area of a sample including a latent fingerprint and irradiation of the surface area with light to cause emission of fluorescence from the fluorescent dye or fluorescent substance exhibiting an image of the fingerprint lines which comprises the steps of:

(a) bringing a gelatin film impregnated with a solution of the fluorescent dye or the chemical reagent into direct contact with the surface area of the sample including the

latent fingerprint so as to have the solution adhere to the surface area;

(b) peeling the gelatin film off the surface of the sample; and

(c) irradiating the surface area of the sample with light having a wavelength capable of exciting the fluorescent dye or the fluorescent substance to emit fluorescence giving a fluorescent image of the fingerprint lines.

4,708,883

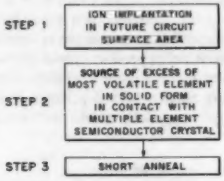
ANNEALING PROCESS

Harold J. Hovel, Katonah, and Thomas F. Kuech, Ossining, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 630,056, Jul. 12, 1984, abandoned. This application Jan. 23, 1986, Ser. No. 821,139

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—38 **18 Claims**


STEP 1
ION IMPLANTATION IN FUTURE CIRCUIT SURFACE AREA
STEP 2
SOURCE OF EXCESS OF MOST VOLATILE ELEMENT IN SOLID FORM IN CONTACT WITH MULTIPLE ELEMENT SEMICONDUCTOR CRYSTAL
STEP 3
SHORT ANNEAL

1. A process for uniform ion implantation activation in a multielement compound semiconductor crystal comprising:

implanting semiconductor property imparting impurities through a device area surface of said crystal;

placing a major surface of a member in contact with said device area surface of said crystal wherein said member is provided with interstices and said member contains the most volatile element of said multielement compound semiconductor crystal; and

annealing the combination of said member and said crystal while confining the vaporization product of said member to said surface.

4,708,884

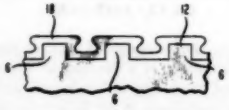
LOW TEMPERATURE DEPOSITION OF SILICON OXIDES FOR DEVICE FABRICATION

Edwin A. Chandross, Berkeley Heights; Robert E. Dean, High Bridge; Patrick K. Gallagher, Basking Ridge; Roland A. Levy, Berkeley Heights; Frank Schrey, Neshanic Station, and Gerald Smolinsky, Madison, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 722,433, Apr. 15, 1985, Pat. No. 4,597,985, which is a continuation of Ser. No. 629,950, Jul. 11, 1984, abandoned. This application Jun. 18, 1986, Ser. No. 875,475

Int. Cl.[4] B05D *3/14*

U.S. Cl. 427—39 **15 Claims**



1. A process for forming a device including a region of a material which comprises a silicon oxide, said process comprising the steps of subjecting a substrate to an environment into which a gas stream is introduced, and inducing a reaction that leads to deposition of said material n said substrate, said gas stream comprising

(i) a composition selected from the group consisting of diacetoxyditertiarybutoxysilane (DADBS), diacetoxydiisopropoxysilane (DADIS), and tritertiarybutoxyethoxysilane (TBES), and

(ii) an additive selected form the group consisting of organophosphites, organophosphates and organoborates,

wherein said deposition is induced at a temperature less than 600 degrees C., and whereby said deposition has a conformance of at least 0.9.

4,708,885

MANUFACTURING METHOD FOR AN ELECTRONIC COMPONENT

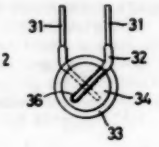
Shigeki Saito, Fukui; Takao Hosokawa, Tsuruga, and Masataka Mae, Fukui, all of Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto, Japan

Filed Nov. 20, 1986, Ser. No. 932,567

Claims priority, application Japan, Nov. 22, 1985, 60-263493

Int. Cl.[4] B05D *5/12*

U.S. Cl. 427—58 **3 Claims**



1. A method of manufacturing an electronic component provided with lead terminals attached to an electrode in said electronic component, said electronic component being coated with an overcoat resin, which comprises dipping lead terminals into a repellent against the overcoat resin such that the repellent is coated on the lead terminals at a predetermined distance from the center and end of said lead terminals, dipping the end portion of the lead terminals into a preliminary solder so that the end portions are coated with the solder up to the location of the repellent coating, abutting the lead terminal coated with the preliminary solder and repellent against the electronic component such that the preliminary solder portion of the lead terminals is positioned against the electrode of the electronic component and the repellent coated portion is located at the outer peripheral edge of the electronic component, respectively, remelting the preliminary solder so as to solder the lead terminal to the electrode and dipping the entire electronic component into an overcoat resin so that the overcoat resin adheres to the entire surface of the electronic component, including the exposed lead terminals.

4,708,886

ANALYSIS SYSTEM

Larry A. Nelson, Spokane, Wash., assignor to Fisher Scientific Company, Pittsburgh, Pa.

Filed Feb. 27, 1985, Ser. No. 706,072

Int. Cl.[4] G01N *35/04, 21/07*

U.S. Cl. 422—72 **18 Claims**

1. An analysis system of the fast centrifugal analyzer type, comprising

a first storage area for storing sample materials at an appropriate storage temperature,

a second area which is maintained at a controlled and stabilized higher temperature at which the analysis is to be performed, structure defining an analysis station and structure defining a supply station in said second area,

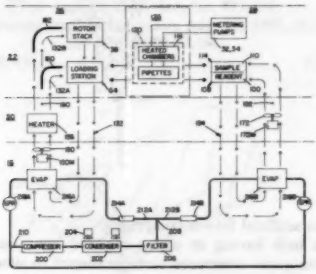
means for storing a pluraity of multicuvette rotors of long thermal time constant material adjacent said supply station structure for time intervals sufficient for those rotors to be equilibrated to the analysis temperature, said means for storing multicuvette rotors including feeder structure for disposing multicuvette rotors in spaced stacked relation,

a thermal energy exchange system comprising a refrigerant circuit having a refrigerant circuit portion, means for flowing refrigerant through said circuit portion,

flow control means for varying without blocking the flow of refrigerant through said circuit portion,

flow circulation means for flowing an air stream through a recirculation loop in heat exchange relation to said circuit portion and through said second area,

means for sensing the temperature of said air stream and operating said flow control means to control refrigerant flow in said circuit portion to maintain the temperature of said air stream substantially at said higher temperature,



said flow circulation means flowing said air stream at said higher temperature through spaced multicuvette rotors in said stack in heat exchange relation thereto to thermally equilibrate multicuvette rotors to said analysis temperature,

transport mechanism in said second area adapted to transport equilibrated multicuvette rotors sequentially from said supply station to said analysis station in said second storage area and then to a used rotor station, and

transfer mechanism arranged for movement between said first and second storage areas for transferring a quantity of sample material from said first storage area for loading into an equilibrated rotor in said second storage area.

4,708,887

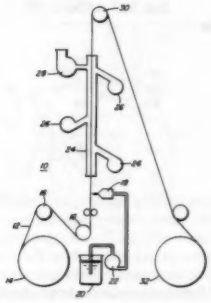
METHOD FOR COLORING POLYMER-INSULATED WIRE

Gordon D. Baxter, Kinston; James C. Grant, and John N. Garner, both of Kingston, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jan. 20, 1987, Ser. No. 4,518

Int. Cl.[4] B05D *5/12*

U.S. Cl. 427—118 **8 Claims**



1. A method for colouring polymer-insulated wire comprising:

applying colourant comprising a solvent and a colouring agent dissolved in the solvent to a polymer-insulated wire; and

passing the coloured wire first through air heated sufficiently to evaporate a portion of the solvent and then through air cooled sufficiently to harden an outer surface of the colourant before the coloured wire contacts any surface.

4,708,888

COATING METAL MESH

Thomas A. Mitchell, Mentor; John E. Bennett; Claude M. Brown, both of Painesville, and Gerald R. Pohto, Mentor, all of Ohio, assignors to ELTECH Systems Corporation, Chardon, Ohio

Continuation-in-part of Ser. No. 731,420, May 7, 1985, abandoned. This application Apr. 29, 1986, Ser. No. 855,551

Int. Cl.[4] C23F *13/00*

U.S. Cl. 427—126.1 **16 Claims**

1. A method of manufacturing an electrode for electrochemical processes, of the type comprising a valve metal mesh provided with a pattern of substantially diamond shaped voids having LWD and SWD dimensions for units of the pattern, the pattern of voids being defined by a continuum of thin valve metal strands interconnected at nodes and carrying on their surface an electrocatalytic coating, comprising:

(a) providing a flexible, coiled valve metal mesh of thickness less than 0.125 cm having a void fraction of at least 80 percent, said mesh being elongated along the direction of the SWD dimension of the pattern and being coiled about an axis along the direction of the LWD dimension of the pattern, and

(b) applying an electrocatalytic coating to the surface of the valve metal mesh while same is coiled to provide a flexible coated mesh electrode in coiled configuration, the mesh being uncoilable from the coiled configuration for use as an electrode.

4,708,889

GLASS REPAIR OF HERMETIC PACKAGES

Ray L. Hammond, Scottsdale, and Thomas B. Chatham, Mesa, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 23, 1986, Ser. No. 877,647

Int. Cl.[4] B05D *3/02;* **B29C** *35/02;* **B32B** *35/00;* **C03B** *23/20*

U.S. Cl. 427—140 **3 Claims**

1. A method for repairing leaks in an envelope of a hermetically sealed package containing electrical components, which package is formed from materials selected from the group consisting of metal, glass and ceramic, said method comprising the steps of:

providing a liquid, silicate and solvent mixture including tetraethylorthosilicate;

creating a lower pressure inside the envelope to be repaired;

applying the liquid, silicate and solvent mixture to the envelope to be repaired so the liquid silicate and solvent mixture is drawn into leaks in the envelope due to the lower pressure; and

removing the solvent from the mixture in the leaks by baking the package, thereby leaving a solid silicate patch having a thermal coefficient of expansion closely matching that of the envelope.

4,708,890

METHOD FOR PREVENTING POLYMER SCALE DEPOSITION ON THE REACTOR WALLS IN THE POLYMERIZATION OF ETHYLENICALLY UNSATURATED MONOMERS

Toshihide Shimizu, Chiba; Ichiro Kaneko, Ibaraki; Mikio Watanabe, Ibaraki, and Yoshiteru Shimakura, Ibaraki, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Jul. 18, 1986, Ser. No. 886,721
Claims priority, application Japan, Jul. 18, 1985, 60-158587
Int. Cl.[4] C08F *2/00*
U.S. Cl. 427—230 **4 Claims**

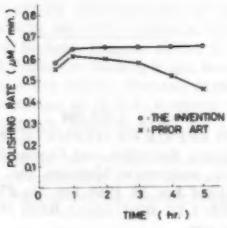
1. A method for preventing polymer scale deposition on the reactor walls in the polymerization of an ethylenically unsaturated mononer in an aqueous polymerization medium which comprises coating the surface of the reactor walls with a coating solution containing (a) a silicic acid compound and (b) a phosphorous compound selected from the group consisting of phytic acid, polyphosphoric acid, di(triethanolamine) salt of phytic acid, trimetaphosphoric acid, ammonium magnesium phosphate, sodium polyphosphate, hyperphosphoric acid, sodium phosphate, pyrophosphoric acid, polymetaphosphoric acid, disodium salt of phytic acid, tetrametaphosphoric acid, di(ethylamine) salt of phytic acid, ethyl phosphine oxide, trimethyl phosphate and ethyl phosphorous acid, in combination dissolved in an aqueous solvent and then drying the thus coated surface prior to introduction of the polymerization mixture into the polymerization reactor.

4,708,891

METHOD FOR MANUFACTURING POLISHING CLOTHS

Hajime Ito, Izumisano, and Junichi Miwa, Sennan, both of Japan, assignors to Toyo Cloth Co., Ltd., Sennan, Japan

Filed Feb. 24, 1986, Ser. No. 832,295
Claims priority, application Japan, Dec. 16, 1985, 60-284072
Int. Cl.[4] B05D *3/00, 3/02, 3/12, 5/00*
U.S. Cl. 427—245 **6 Claims**



1. A method for producing a polyurethane-based polishing cloth which comprises the steps of:

impregnating, with a solution containing a polyurethane elastomer, a nonwoven fabric sheet made of a synthetic fiber having a melting point higher than that of said polyurethane elastomer;

wet-coagulating the resulting impregnated sheet to form a microporous composite sheet; and

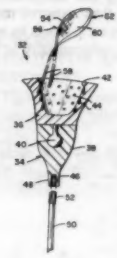
heating the resulting composite sheet in an essentially uncompressed condition at a temperature higher than the softening point of the polyurethane elastomer and lower than the melting point of the synthetic fiber for a sufficient length of time to impart to the sheet a degree of hardness greater than 80 and an air-permeability greater than 25 cc/cm^2/second.

4,708,892

ARTIFICIAL FLOWER

Elaine L. Young, 97-30 57th Ave., Rego Park, N.Y. 11368, and George Spector, 233 Broadway Rm 3815, New York, N.Y. 10007

Filed Oct. 27, 1986, Ser. No. 923,590
Int. Cl.[4] A41G *1/00*
U.S. Cl. 428—24 **2 Claims**



1. An artificial flower comprising:

(a) a bulb having an upper cup and lower support with contiguous contoured surfaces shaped to simulate a bulb and connected by means whereby said upper cup can rotate with respect to said lower support, said upper cup having a cavity with a plurality of randomly placed holes therein;

(b) a stem having an end adapted to be connected to said bulb;

(c) a plurality of flexible frames, each said frame formed from a flexible lightweight strand like material bent over to make a loop and having two spaced ends; and

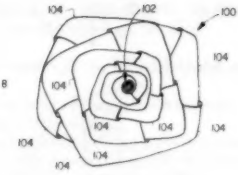
(d) a plurality of elastic knitted fabric material pieces, each said piece formed from textured synthetic yarns tautly stretched over each said loop to cover said loop except for said ends thus making a plurality of petals, said loop ends can be plugged into any two of said holes within said cavity of said upper portion of said bulb so that each of said petals can be twisted into different shapes and the upper portion of said bulb can be turned for changing the appearance of said artificial flower.

4,708,893

METHOD FOR MAKING FABRIC ROSES

John D. Little; Lorianne C. Little, both of 26131 Tono, Mission Viejo, Calif. 92692, and John Wood, 160 Centennial Ave., Chico, Calif. 95928

Filed May 21, 1986, Ser. No. 865,538
Int. Cl.[4] A41G *1/00*
U.S. Cl. 428—26 **9 Claims**



1. A method for making fabric roses, comprising:

(a) rotating a length of fabric ribbon by means of a variable speed motor having a first needle device and a second needle device, said first and second needle devices holding one end of said ribbon therebetween;

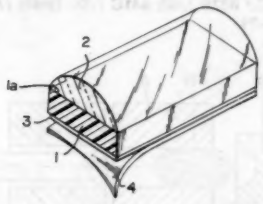
(b) folding said fabric ribbon in a direction away from said first and second needle devices to form a multiplicity of petals of a fabric rose;
(c) removing said fabric rose from said first and second needle devices; and
(d) sealing said fabric rose at a base portion thereof by heat-sealing means.

4,708,894

ORNAMENTAL AND PROTECTIVE MOLDING

Akira Mabuchi, and Shinji Jinushi, both of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd., Nishi Kasugai, Japan

Filed Aug. 18, 1986, Ser. No. 897,354
Claims priority, application Japan, Aug. 29, 1985, 60-190529
Int. Cl.[4] B60R *13/04*
U.S. Cl. 428—31 **2 Claims**



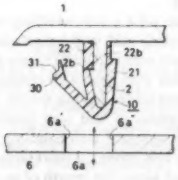
1. An ornamental and protective molding comprising a belt-shaped support of a synthetic resin of which is coated with a transparent synthetic resin layer having a positive meniscus, said transparent synthetic resin layer comprises a cured polyurethane that is the reactive product of a polyether polyol component and an aliphatic polyisocyanate component, wherein the polyether polyol component comprising diols that are alkylene oxide adducts of bisphenol A and have a number average molecular weight of 3,000 or less is used singly or in combination.

4,708,895

PLASTIC FASTENER

Akira Mizusawa, Yokohama, Japan, assignor to Nifco, Inc., Yokohama, Japan

Filed Sep. 26, 1986, Ser. No. 912,351
Claims priority, application Japan, Sep. 30, 1985, 60-149373[U]
Int. Cl.[4] B60R *13/04*
U.S. Cl. 428—31 **5 Claims**



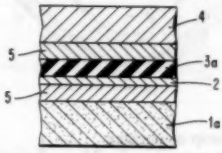
1. A plastic fastener comprising: a body including two side walls facing and spaced apart from each other and having upper and lower portions, one of said side walls being provided on the inner side with a shoulder facing toward said lower portions; and at least one elastic engagement piece extending obliquely upwardly from the lower portion of at least one of said side walls and having a lock piece provided at the free end, said lock piece having an outer surface and an upper free end, said lock piece including an upwardly directed shoulder on said outer surface, whereby a projection from a workpiece can be retained in said fastener and said fastener mounted in an aperture in a mounting wall.

4,708,896

EASILY OPENABLE PACKAGING MATERIAL FOR PHOTOGRAPHIC PHOTOSENSITIVE MATERIALS

Mutsuo Akao, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Ashigara, Japan

Filed Aug. 19, 1986, Ser. No. 897,788
Claims priority, application Japan, Aug. 19, 1985, 60-125687[U]
Int. Cl.[4] B65D *35/08*; B32B *27/00*
U.S. Cl. 428—35 **9 Claims**



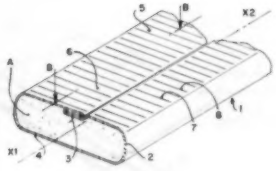
1. An easily openable packaging material for photographic photosensitive materials which comprises,
a light-shielding heat-sealable film layer containing a lubricant, a light-shielding material and more than 50 wt. % of a high-pressure low-density polyethylene resin and being located as the inner layer,
an aluminum foil layer which is laminated on said heat-sealable film layer with a delamination resistance of greater than 400 g/15 mm width and on the heat-sealable film layer side of which an anchor coat layer is formed, and
a heat-resistant flexible sheet layer which is laminated on said aluminum foil layer and of which heat resistance is higher than said heat-sealable film layer by 5° C. or more.

4,708,897

COMPOSITE PRODUCT HAVING A TUBULAR METAL CASING WITH A WELT-TYPE SEAM, AND A CORE IN POWDER FORM, WHICH CAN BE ROLLED UP

Michel Douchy, Vertain, France, assignor to Vallourec, France

Filed Feb. 27, 1984, Ser. No. 583,815
Claims priority, application France, Mar. 3, 1983, 83 03967
Int. Cl.[4] B32B *33/00*; C22B *9/10*
U.S. Cl. 428—36 **9 Claims**



1. In a composite product comprising a tubular metal casing (2) and at least one compacted powder or granular material (A) contained within the casing, said casing being formed from a strip joined by a welt-type seam (3) along a generatrix, the improvement wherein said casing has hollow impressed portions on its outside wall, straddling the seam region, said impressed portions being formed by cold deformation of the metal in the form of grooves which are elongate transversely with respect to the axis of the product, the depth of said impressed portions not exceeding 60% of the thickness of the casing, whereby said impressed portions prevent deformation and unhooking of the seam.

4,708,898

SEALING STRIPS

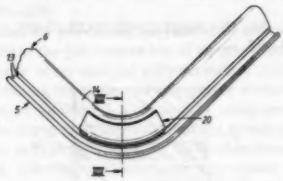
Hervé Gommier, Illiers, and Jean-Michel Lamblin, Gellainville, both of France, assignors to Draftex Industries Limited, Edinburgh, Scotland

Filed Mar. 20, 1986, Ser. No. 841,627

Claims priority, application United Kingdom, Mar. 21, 1985, 8507301; Mar. 23, 1985, 8507616

Int. Cl.[4] E06B *7/16*

U.S. Cl. 428—36 5 Claims



1. A sealing strip comprising

longitudinally extending flexible sealing means curved to match a bend of small radius,

longitudinally extending gripping means in the form of channel-shaped longitudinally extending material on the outside of which the sealing means is mounted and supported, the gripping means embracing and gripping a mounting flange or the like running along at least part of the periphery of an opening to be sealed by the sealing strip,

a stiff support member positioned at the apex of the bend and configured to match the radius there and in contact with and secured to a surface of the sealing means on the outside of the bend, whereby substantially to prevent distortion of the sealing means at the bend, the support member having a part which is held in the channel of and gripped by the gripping means so as to support the support member.

4,708,899

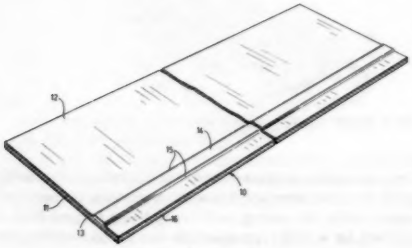
LAMINATED PANEL WITH INTEGRAL RAISED SCUFF

Bela Molnar, London, Canada, assignor to Protective Plastics Limited, Scarborough, Canada

Continuation-in-part of Ser. No. 412,811, Aug. 30, 1982, Pat. No. 4,427,475, which is a continuation of Ser. No. 278,214, Jun. 29, 1981, abandoned. This application Jan. 23, 1984, Ser. No. 573,147

Int. Cl.[4] B32B *3/30*

U.S. Cl. 428—60 6 Claims



1. A laminated panel having at least one straight longitudinal edge and a raised scuff extending parallel to said edge on one side of the panel for the whole length thereof, the panel comprising a laminar core, a first unitary covering of resin-impregnated fibrous material laminated in situ to said one side of the core, a second unitary covering of resin-impregnated fibrous material laminated in situ to the other side of the core, said first covering comprising a sheet of said resin-impregnated fibrous material covering the entire area of said one side of the core and an elongate strip of said resin-impregnated fibrous material superposed thereon and molded in situ onto the sheet to form an integral thickened region of the covering defining said scuff, the longitudinal edges of the thickened region being bevelled and merging into said sheet.

4,708,900

FIBROUS PERFUME CARRIER FOR ARTIFICIAL FLOWERS AND A PROCESS FOR ITS MANUFACTURE

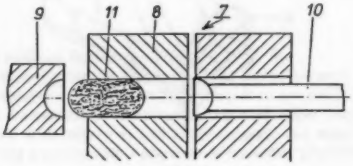
Hans-Peter Siegers, Wegberg, and Wilfried Macke, Toenisvorst, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 3, 1985, Ser. No. 719,176

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1984, 3416007

Int. Cl.[4] B32B *5/02;* A41G *1/00;* D04H *11/04*

U.S. Cl. 428—74 33 Claims



1. A method of manufacturing a perfume carrier for an artificial flower consisting essentially of:

mechanically stabilizing a nonwoven absorbent material having a surface which releases the perfume by evaporation, by needle punching said nonwoven; and

axially compressing said stabilized nonwoven in a cylindrical ram press of which all surfaces contacting said nonwoven are heated, until a perfume carrier blank is formed.

15. A perfume carrier blank manufactured by the method of claim 1.

4,708,901

CODED WEB AND ASSOCIATED WEB HANDLING AND WORKING MACHINE

Kenneth O. Wood, Ellington, Conn., assignor to Gerber Scientific Products, Inc., Manchester, Conn.

Filed Sep. 20, 1985, Ser. No. 778,146

Int. Cl.[4] B32B *3/02, 3/10*

U.S. Cl. 428—131 2 Claims

1. A web for use with a web handling machine having feeding means for feeding said web longitudinally of itself, a tool for working on said web and code reading means for reading a code means on said web, said web comprising:

an elongated worksheet having means for cooperating with the feeding means of said web handling machine to feed said web through said web handling machine,

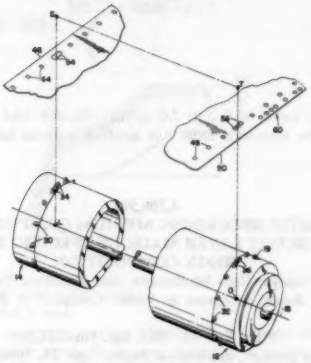
said worksheet also having a work area for working by said tool extending along the length of said worksheet and said work sheet in said work area having at least one characteristic which may have different values at different points spaced a long the length of said worksheet, and

code means, integral with said worksheet, providing a plurality of individual codes each located at a respective one of a plurality of positions spaced from one another along the length of said worksheet, each of said codes comprising a plurality of data bits encoded to provide information as to the value of said at least one characteristic in the vicinity of said code and said data bits being readable by said code reading means as said web is fed through said

web handling machine by said feeding means of said web handling machine.

said worksheet having two side edge portions extending along the length thereof and between which said work area is located.

said means for cooperating with the web feeding means of said web handling machine comprising a first row of holes in one of said side edge portions of said worksheet and a second row of holes in the other of said side edge portions of said worksheet, the holes of both of said rows being spaced from one another by a constant spacing along the length of said worksheet, the holes of each of said rows including a plurality of feed holes and a lesser plurality of



keying holes, said keying holes being spaced regularly from one another along the length of said worksheet and there being a constant number of said feed holes appearing between each adjacent pair of said keying holes, each of said keying holes having associated with it a characteristic making it visually distinguishable from said feed holes, said keying holes of one of said rows appearing at the same positions along the length of said worksheet as the keying holes of the other of said rows, and

said codes being located at positions spaced from one another along the length of said worksheet by the same spacing as appears between said keying holes of each of said rows of holes.

4,708,902

POLYESTER FILMS SUITABLE FOR USE IN MAGNETIC RECORDING MEDIA

Shigeo Utsumi, Yokohama; Tateo Kanesaki, both of Nagahama; Takashi Kagiyama, Yokohama; Satoshi Otonari, Machida; Koichiro Ikushima, and Norio Okumura, both of Nagahama, all of Japan, assignors to Diafoil Company, Limited, Tokyo, Japan

Continuation of Ser. No. 718,206, Apr. 2, 1985, abandoned, which is a continuation of Ser. No. 497,232, May 23, 1983, abandoned. This application Feb. 10, 1987, Ser. No. 13,152

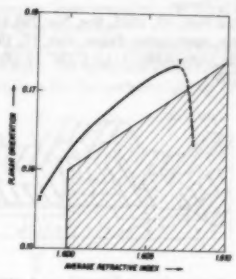
Claims priority, application Japan, Jun. 8, 1982, 57-98121

Int. Cl.[4] G11B *5/62*

U.S. Cl. 428—141 **2 Claims**

1. In a magnetic recording medium comprising a base film as a main constructive layer of a biaxially oriented polyethylene terephthalate film and a ferromagnetic layer provided at least on one of the surfaces of said base film, the improvement comprising that the base film satisfies the following relations (I), (II) and (III) describing an average refractive index n and, a planar orientation ΔP, and a surface roughness Ra:

$$\bar{n} \geqq 1.605 \quad \text{(I)}$$



$$\Delta P < (1.43 - \bar{n}) - 2.128 \quad \text{(II)}$$

$$Ra \leqq 0.008\ \mu m \quad \text{(III)}$$

4,708,903

HEAT-SENSITIVE TRANSFER SHEET

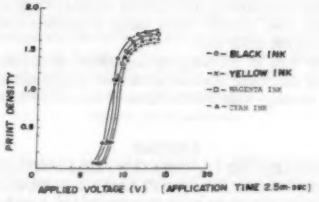
Tsuneo Tanaka; Tetsuro Yoshitomi; Koji Hanada; Mashato Ohashi, and Michichika Hikosaka, all of Tokyo, Japan, assignors to Toyo Ink Manufacturing Co., Ltd. and Toppan Printing Co., Ltd., both of Tokyo, Japan

Filed Apr. 14, 1986, Ser. No. 851,342

Claims priority, application Japan, Apr. 17, 1985, 60-80075

Int. Cl.[4] B41M *5/26*

U.S. Cl. 428—195 **8 Claims**



1. A heat-sensitive transfer sheet comprising (1) a base film, (2) a first hot melt layer composed mainly of wax, (3) a coloring layer comprising at least one colorant selected from the group consisting of dyes and pigments, and as a vehicle at least one resin selected from the group consisting of acrylic resins, styrene resins, ester resins, rosins, vinyl resins, acetal resins, polyamide resins, rubbers and cellulose derivatives, and (4) a second hot melt layer composed mainly of wax, said layers being formed on said base film in this order, whereby said second layer is the top layer.

4,708,904

SEMICONDUCTOR DEVICE AND A METHOD OF MANUFACTURING THE SAME

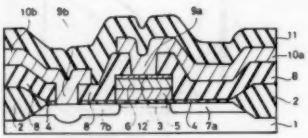
Masahiro Shimizu; Tatsuo Okamoto, and Katsuhiro Tsukamoto, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 15, 1985, Ser. No. 798,639

Claims priority, application Japan, Jan. 17, 1985, 60-7905

Int. Cl.[4] B32B *3/00;* **B44C** *1/22;* **C23C** *14/00;* **B05D** *5/12*

U.S. Cl. 428—209 **11 Claims**



1. A semiconductor device formed by a metal-oxide semiconductor element, said metal-oxide semiconductor element comprising a semiconductor substrate and a conductive region formed on said semiconductor substrate,

said conductive region including:

a first conductive layer containing at least a first refractory metal; and

a second conductive layer formed on said first conductive layer by a refractory metal silicide formed of a different refractory metal than said first refractory metal and having corrosion resistance against a solution containing hydrofluoric acid.

11. A method of manufacturing a semiconductor device formed by a metal-oxide semiconductor element having a semiconductor substrate, said method comprising:

a first step of forming by deposition a first conductive layer containing at least a first refractory metal and having a high melting point on said semiconductor substrate;

a second step of forming by deposition on the first conductive layer a second conductive layer by a second refractory metal silicide smaller in thickness than said first conductive layer and having corrosion resistance against a solution containing hydrofluoric acid on said first conductive layer;

a third step of etching away portions of said first and second conductive layers to form a desired pattern in predetermined regions of said first and second layers;

a fourth step of forming an oxide fim entirely over the exposed substrate and conductive layer surfaces;

a fifth step of etching contact holes through said oxide film in predetermined positions on said semiconductor substrate;

a sixth step of cleansing the exposed surface of said substrate through said contact holes using a solution containing hydrofluoric acid; and

a seventh step of forming by deposition an electrode for making electrical contact with said semiconductor substrate through said contact hole.

4,708,905

METAL-DEPOSITED LAMINATED FILM AND METHOD FOR MAKING CAPACITOR ELEMENTS USING SAME

Toshiya Yoshii, Otsu, and Kazuo Okabe, Shiga, both of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

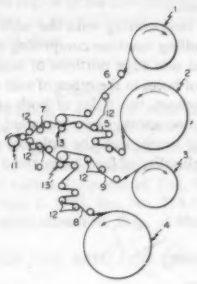
Filed Feb. 4, 1985, Ser. No. 697,845

Claims priority, application Japan, Feb. 6, 1984, 59-18244

Int. Cl.[4] B32B *7/02, 15/08, 27/08*

U.S. Cl. 428—216 **14 Claims**

1. A peelable metal-deposited laminated film including an ultrathin peelable layer usable for a capacitor comprising an oriented polyethylene-terephthalate film having a thickness of 0.2 to 2.0 μm, a metal layer vacuum deposited at a thickness of 0.03–0.3 μm on one surface of said polyethylene-terephthalate film, and a propylene copolymer film separably bonded closely to the surface of the polyethylene-terephthalate film opposite to the metal-deposited surface, said films being bonded with an



adhesive force of 0.1 to 2.0 g/cm whereby said films may readily be separated from one another without breaking the films.

4,708,906

MAGNETIC RECORDING MEDIUM COMPRISING AN UNDERCOAT LAYER MADE OF SPECIFIC TYPE OF RESIN COMPOSITION

Satoshi Sekiya; Ikuo Matsumoto, and Kuniharu Fujiki, all of Mito, Japan, assignors to Victor Company of Japan, Ltd., Japan

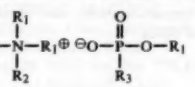
Filed Apr. 17, 1985, Ser. No. 724,288

Claims priority, application Japan, Apr. 18, 1984, 59-76703; Apr. 18, 1984, 59-76704

Int. Cl.[4] G11B *5/68*

U.S. Cl. 428—336 **10 Claims**

1. In a magnetic recording medium which comprises a non-magnetic support, an undercoat layer formed on the support, and a magnetic recording layer formed on the undercoat layer, the improvement in that said undercoat layer is made of a compostion which comprises 100 parts by weight of a thermosetting polyurethane resin, 2 to 10 parts by weight of carbon black, and 1 to 10 parts by weight of an ammonium salt of a phosphoric ester of the following formula



in which each R_1, each R_2 and R_3 independently represent an alkyl group having from 1 to 18 carbon atoms, an alkoxy group having from 1 to 4 carbon atoms, or a phenyl group.

4,708,907

WRITABLE ADHESIVE TAPE

Fulvio Flutti, Cernobbio, and Franco Ghezzi, Savona, both of Italy, assignors to Boston S.p.A., Bollate, Italy

Filed Apr. 26, 1985, Ser. No. 727,467

Claims priority, application Italy, May 4, 1984, 20815 A/84

Int. Cl.[4] C09J *7/02*

U.S. Cl. 428—352 **16 Claims**

1. A self-sticking tape, comprising a flexible substrate, a self-sticking coating on one side thereof, and an antiadhesive writable coating on the opposite side, comprising at least one film forming resin along with at least one anti-adhesive agent and at least one matting agent, wherein said substrate is selected from oriented and non-oriented films of alpha-olefine polymers and copolymers, having at least the side bearing said anti-adhesive coating free from any additional priming layer

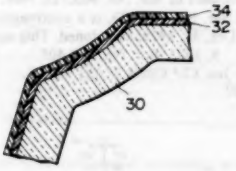
and adhesion promoting surface treatment, and said anti-adhesive writable coating comprises 25% to 55% by weight of at least one chlorinated polyolefine and 20% to 50% by weight of a polyaldehyde resin as said film-forming resin and as substrate adhesive promoter resin.

4,708,908

PLASTIC PARTS WITH SURFACE-HARDENING COATING CONTAINING ULTRAVIOLET ABSORBER

Yasuo Tateoka, Yokosuka; Ryuzo Uemura, Miura, and Takatoshi Sagawa, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama City, Japan

Filed Sep. 27, 1985, Ser. No. 780,885
Claims priority, application Japan, Oct. 5, 1984, 59-208301
Int. Cl.[4] B32B *27/18*
U.S. Cl. 428—423.1 **15 Claims**



1. A plastic part comprising:
a plastic body; and
a surface-hardening coating film which is formed on a surface of said plastic body and comprises a plastic primer layer laid directly on said surface and a hard-coat layer of a polymer base composition laid on said primer layer, said primer layer comprising an organic resin and an ultraviolet absorber which is low in bleeding tendency and amounts to 0.5–50 wt% of the organic resin of the primer, said ultraviolet absorber being an organic compound having a vapor pressure not higher than 1×10^{-5} KPa at 100° C.

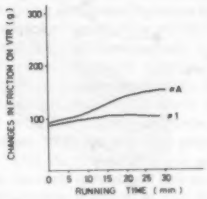
4,708,909

RADIATION-CURABLE, MAGNETIC COATING MATERIAL AND MAGNETIC RECORDING MEDIUM USING THE SAME

Akira Ohtsuki; Ryozo Konno; Nobumori Kanno; Makio Sugai; Takashi Mihoya; Yuichi Kubota; Masaharu Nishimatsu; Yukihiro Isobe; Kazushi Tanaka, and Osamu Shinoura, all of Tokyo, Japan, assignors to Toyo Ink Mfg. Co., Ltd., Tokyo, Japan

PCT No. PCT/JP82/00284, § 371 Date Feb. 28, 1983, § 102(e) Date Feb. 28, 1983, PCT Pub. No. WO83/00340, PCT Pub. Date Feb. 3, 1983
Continuation of Ser. No. 781,200, Sep. 26, 1985, abandoned, which is a continuation of Ser. No. 480,958, Feb. 28, 1983, abandoned. This PCT application Jul. 22, 1982, Ser. No. 933,268
Claims priority, application Japan, Jul. 22, 1981, 56-113594
Int. Cl.[4] G11B *5/702*
U.S. Cl. 428—425.9 **4 Claims**

1. A magnetic recording medium which comprises a base and a magnetic coating material consisting essentially of (1) a magnetic powder (2) a first radiation cured resin or mixture of resins which in the uncured state is a water soluble resin, a water dispersible resin or mixtures thereof having a molecular weight of at least 5000, each of said resins in the uncured state being selected from the group consisting of:
(a) Reaction products of a compound having at least one hydroxyl group in the molecule, a polyisocyanate compound, and a compound having a group reactive with the isocyanate group and at least one radiation curable, unsaturated double bond, at a molecular ratio of one to at least one;
(b) Reaction products of a compound having at least one epoxy group in the molecule and a compound having a group reactive with the epoxy group and at least one radiation-curable, unsaturated double bond, at a molecular ratio of one to at least one;
(c) Reaction products of a compound having at least one carboxyl group in the molecule and a compound having a group reactive with the carboxyl group and at least one



radiation-curable, unsaturated double bond, at a molecular ratio of one to at least one; and
(d) Polyester compounds containing at least one radiation-curable, unsaturated double bond,
and (3) a second radiation cured resin or mixture of resins which in the uncured state is a water soluble resin, a water dispersible resin or mixtures thereof and is further characterized by the presence of at least one unsaturated double bond curable upon exposure to radiation and as having a molecular weight of from 200 to 5000.

4,708,910

FIRE-RESISTANT WOOD COMPOSITES, IN PARTICULAR WALLBOARDS, PROCESS FOR MANUFACTURE OF SAME AND USE OF A BONDING AGENT IN THE MANUFACTURE

Bengt Forss, Pargas, Finland, assignor to Forss Consult Ky, Kb, Finland

PCT No. PCT/FI85/00078, § 371 Date Jun. 30, 1986, § 102(e) Date Jun. 30, 1986, PCT Pub. No. WO86/01766, PCT Pub. Date Mar. 27, 1986
PCT Filed Sep. 20, 1985, Ser. No. 878,884
Claims priority, application Finland, Sep. 21, 1984, 843728
Int. Cl.[4] B27N *9/00;* **B32B** *21/02*
U.S. Cl. 428—453 **13 Claims**

1. Fire-resistant wood composite containing a wood component selected from the group consisting of wood chips, wood fiber, sawdust and wood wool, and a bonding agent, characterized in that said bonding agent consists of a finely-ground hydraulic blast-furnace slag which is activated by an activator having an alkaline reaction and water glass.

4,708,911

THREE DIMENSIONAL DISPLAY DEVICE FOLDED FROM A SINGLE SHEET OF MATERIAL

Allen B. Mage, 5113 Baltimore St., Los Angeles, Calif. 90042

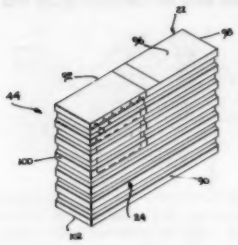
Filed Jul. 18, 1986, Ser. No. 886,652
Int. Cl.[4] A63H *33/16*
U.S. Cl. 428—542.8 **31 Claims**

1. A decorative display device having a design on a flat face thereof capable of use as a relatively flat suspendable poster and capable of being folded to a three dimensional display object, said display device comprising:
(a) a flat sheet of foldable material initially having a flat front face with upper and lower edges and a pair of spaced apart side edges,
(b) a design on the front flat face allowing the device to be

suspended in the position of a poster and said design being characterized by a plurality of individual design elements.

(c) a plurality of first fold lines extending across said sheet generally between said spaced apart side edges forming individual segments which extend between said side edges and at least certain of said segments corresponding to certain of the individual design elements,

(d) a plurality of second fold lines extending between the upper and lower edges of said sheet permitting folding of



said sheet into spaced apart front and back walls and spaced apart side walls forming a three dimensional continuous shell with an initially open interior which is open at its upper or lower end, and

(e) one of said first fold lines extending between said side edges forming a closure panel which is integral with and bendable on an edge of one of said walls, said closure panel capable of being bent to be disposed over an end thereby enclosing said continuous shell and forming a three dimensional display device.

4,708,912

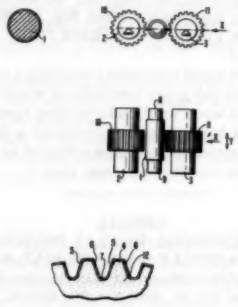
SINTERED METAL BODY WITH AT LEAST ONE TOOTHING

Winfried Huppmann, Radevormwald, Fed. Rep. of Germany, assignor to Sintermetallwerk Krebsoege GmgH, Radevormwald, Fed. Rep. of Germany

Continuation of Ser. No. 632,195, Jul. 18, 1984, abandoned. This application May 27, 1986, Ser. No. 867,156

Int. Cl.[4] B22F *3/02*

U.S. Cl. 428—547 **4 Claims**



1. A sintered metal body with at least one toothing formed by a method, comprising the steps of:

sintering a metal blank having an axis;

arranging at opposite radial sides of the sintered metal blank two rolling tools provided with teeth extending substantially parallel to the axis of the sintered metal blank;

moving at least one of the rolling tools radially towards the other rolling tool and therefore towards the sintered metal blank so that the teeth of the rolling tools penetrate into the sintered metal blank; and

rotating said rolling tools in synchronism by means of a gear transmission so that the sintered metal blank is rotated by frictional resistance and a final toothing is formed in the sintered metal blank by cold rolling.

4,708,913

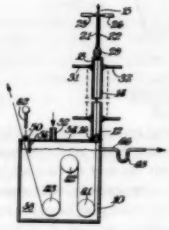
PYROPHORIC PROCESS AND PRODUCT

Alfonso L. Baldi, Wynnewood, Pa., assignor to Alloy Surfaces Company, Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 230,333, Feb. 2, 1981, Pat. No. 4,347,267, and a continuation-in-part of Ser. No. 191,780, Sep. 29, 1980, abandoned, and a continuation-in-part of Ser. No. 172,938, Jul. 28, 1980, abandoned, and a continuation-in-part of Ser. No. 172,671, Jul. 28, 1980, Pat. No. 4,435,481, and a continuation-in-part of Ser. No. 25,456, Mar. 30, 1979, Pat. No. 4,349,612, said Ser. No. 172,671, said Ser. No. 25,456, each is a continuation-in-part of Ser. No. 963,313, Nov. 27, 1978, abandoned, said Ser. No. 230,333, is a continuation-in-part of Ser. No. 89,949, Oct. 31, 1979, abandoned. This application Jul. 8, 1981, Ser. No. 281,405

Int. Cl.[4] C06B *27/00, 33/00*

U.S. Cl. 428—607 **3 Claims**



1. A metal foil less than 10 mils thick having a porous pyrophoric surface, the pyrophoricity of that surface being partially blocked by an added stratum of colloidally sized inert particles.

4,708,914

TRANSPARENT ELECTRODE SHEET

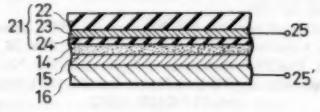
Yoshimi Kamijo, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Jul. 29, 1985, Ser. No. 760,299

Claims priority, application Japan, Jul. 28, 1984, 59-115596[U]

Int. Cl.[4] B32B *9/00*; G02F *1/13*; H01J *1/62*

U.S. Cl. 428—690 **11 Claims**



1. In an accumulated electroluminescence display element (ACELD) of the type comprising a laminate of a transparent electrode sheet, which is composed of a first transparent film layer formed over a transparent electrode layer, a phosphor layer disposed below said transparent electrode sheet, a dielectric layer disposed below said phosphor layer, and a lower electrode layer disposed below said dielectric layer, wherein said phosphor layer is caused to emit light by a voltage applied between said transparent electrode layer and said lower electrode layer,

the improvement wherein said transparent electrode sheet is

further composed of a second transparent plastic film layer formed below said transparent electrode layer as both a protection coating and as a dielectric layer having a specific inductive capacity equal to or larger than 6 at 1 KHz and a thickness equal to or less than 20 μm, whereby a composite transparent electrode sheet is provided with said transparent electrode layer sandwiched in contact between said first and second transparent film layers.

4,708,915

THERMAL HEAD FOR THERMAL RECORDING

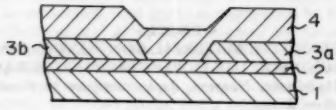
Motokazu Ogawa, Hayato; Yasuo Nishiguchi, Kokubu, and Keijiro Minami, Hayato, all of Japan, assignors to Kyocera Corporation, Kyoto, Japan

Filed Jan. 23, 1986, Ser. No. 821,681

Claims priority, application Japan, Jan. 26, 1985, 60-12853

Int. Cl.⁴ G01D *15/10;* **B47J** *3/20*

U.S. Cl. 428—698 **13 Claims**



1. A thermal head for thermal recording, which comprises a protecting film composed of amorphous tantalum silicon oxynitride, which is formed by a film-forming method.

4,708,916

MOLTEN CARBONATE FUEL CELL

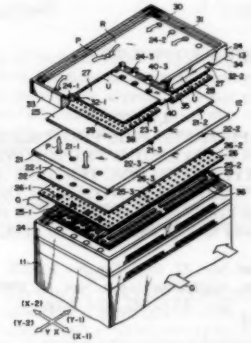
Takashi Ogawa, Yokohama; Tamotsu Shirogami, Yamato, and Kenji Murata, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 7, 1986, Ser. No. 927,942

Claims priority, application Japan, Nov. 8, 1985, 60-250482; Feb. 28, 1986, 61-42935

Int. Cl.⁴ H01M *8/24*

U.S. Cl. 429—38 **18 Claims**



1. A molten carbonate fuel cell comprising:

a plurality of unit cells formed of a plurality of plates each having opposed two flat square surfaces and four sides, each unit cell having a plurality of first and second side segment channels penetrating through said each plate, and a plurality of third segment channels penetrating through said each plate at a center location between side segment channels;

a plurality of separator elements formed of at least one plate having two opposed flat square surfaces and four sides, each separator element having first and second segment channels provided at positions corresponding to the plurality of first and second segment channels of said unit cell, third segment channels provided at positions corresponding to the plurality of third segment channels of said unit cell, first fuel gas passages provided on one side of said separator element, to communicate the first segment channels with the third segment channels of said separator element, second fuel gas passages provided on one side of said separator element, to communicate the second segment channels with the third segment channels of said separator element, and oxidant gas passages formed on the other side of said separator element, said plurality of separator elements being interposed between adjacent said unit cells to form a stacked structure in which the first segment channels of said unit cell communicate with the first segment channels of said separator element, to define a first internal manifold to communicate with the first fuel gas passages, the second segment channels of said unit cell communicate with the second segment channels of said separator element, to define a second internal manifold to communicate with the second fuel gas passages, and the third segment channels of said unit cell are communicated with the third segment channels of said separator element to define a third internal manifold to communicate with the first and second fuel gas passages, fuel gas flowing through the first, second, and third internal manifolds.

4,708,917

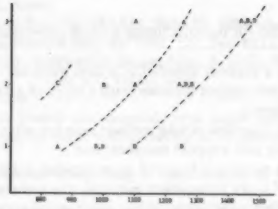
MOLTEN CARBONATE CATHODES AND METHOD OF FABRICATING

Thomas E. Swarr, South Windsor, and John C. Trocciola, Glastonbury, both of Conn., assignors to International Fuel Cells Corporation, South Windsor, Conn.

Filed Dec. 23, 1985, Ser. No. 812,218

Int. Cl.⁴ H01M *4/86;* **B01J** *23/58, 23/00*

U.S. Cl. 429—40 **7 Claims**



1. A molten carbonate fuel cell comprising an anode, a cathode and electrolyte matrix wherein the improvement comprises said cathode formed from a composition comprising:

(a) oxides of nickel;

(b) lithium salts;

(c) barium salts; and

(d) said cathode having a substantially uniform composition throughout;

wherein the cathode has improved strength.

4,708,918

BATTERY ELEMENT AND BATTERY INCORPORATING POLAR POLYMER SYSTEM

Maurice E. Fitzgerald, Havertown; David M. Braunstein, Berwyn, both of Pa.; Saulius A. Alkaitis, Venice, and Naum Pinsky, Thousand Oaks, both of Calif., assignors to Ensci, Inc., Chatsworth, Calif.

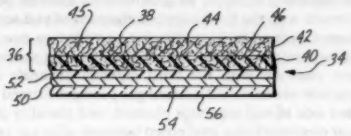
Filed Mar. 24, 1986, Ser. No. 843,053

Int. Cl.⁴ H01M *4/14, 10/18*

U.S. Cl. 429—210 **54 Claims**

1. A battery element useful as at least a portion of the positive plates in a lead-acid battery comprising: an acid resistant

substrate at least partially coated with an electrically conductive coating; and a fluid impervious polymeric matrix layer having mutually opposing first and second surfaces situated



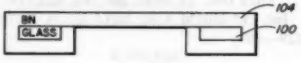
such that at least a portion of said coated substrate is embedded in said matrix layer, provided that said polymeric matrix layer comprises polymer having increased polarity relative to polypropylene.

4,708,919

PROCESS FOR MANUFACTURING A MASK FOR USE IN X-RAY PHOTOLITHOGRAPHY USING A MONOLITHIC SUPPORT AND RESULTING STRUCTURE

Alexander R. Shimkunas, and James J. LaBrie, both of Palo Alto, Calif., assignors to Micronix Corporation, Los Gatos, Calif.

Filed Aug. 2, 1985, Ser. No. 761,998
Int. Cl.[4] G03F 9/00; G03C 5/00; G21K 5/00
U.S. Cl. 430—5 **21 Claims**



1. A process for manufacturing a mask comprising the steps of:

providing a support member of a first material;

covering said output member with a layer of x-ray transparent material;

removing a portion of said support member after said step of covering said support member; and

forming a patterned layer of x-ray opaque material on said layer of x-ray transparent material, the remaining portion of said first material providing mechanical support for said layer of x-ray transparent material such that said remaining portion of said first material remains substantially flat without the need for bonding said remaining portion to an additional support.

4,708,920

MICROLENS SHEET CONTAINING DIRECTIONAL HALF-TONE IMAGES AND METHOD FOR MAKING THE SAME

Bruce D. Orensteen, St. Paul, and Thomas I. Bradshaw, Afton, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

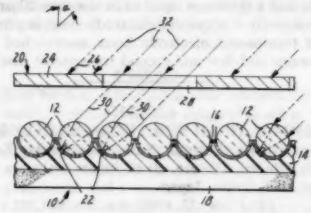
Continuation-in-part of Ser. No. 776,594, Sep. 16, 1985, abandoned. This application Feb. 26, 1987, Ser. No. 19,026
Int. Cl.[4] G03C 1/96; F16L 55/00, 35/00; F16J 15/00
U.S. Cl. 430—11 **19 Claims**

1. A sheet comprising:

(a) a monolayer of closely spaced transparent microlenses,

(b) a means for supporting said microlenses in said monolayer, and

(c) a set of axial markings of substantially equal size, each marking located at the rear of a microlens at a position such that the set of axial markings is visible throughout a



selected conical field of view as an integrated-directional, half-tone image having gradations of light and dark areas.

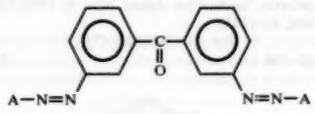
4,708,921

PHOTOSENSITIVE MATERIAL CONTAINING DISAZO COMPOUND FOR USE IN ELECTROPHOTOGRAPHY

Mitsuru Hashimoto, Numazu, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Jan. 21, 1986, Ser. No. 821,099
Claims priority, application Japan, Apr. 18, 1985, 60-83379
Int. Cl.[4] G03G 5/06
U.S. Cl. 430—70 **7 Claims**

1. A photosensitive material for use in electrophotography, comprising an electroconductive substrate and a photosensitive layer on said substrate, said photosensitive layer comprising a charge generating material and a charge transfer material, said charge generating material being a disazo pigment of the formula,



wherein A represents a coupler residue.

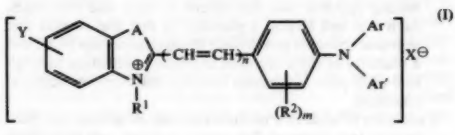
4,708,922

ELECTROPHOTOGRAPHIC PHOTORECEPTOR COMPRISES DIARYLAMINE PHOTOCONDUCTOR AND STYRYL DYE HAVING TERTIARY AMINO MOIETY SUBSTITUTED WITH ARYL GROUPS

Hiroaki Yokoya; Kenji Sano, and Hideo Sato, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 12, 1986, Ser. No. 929,537
Claims priority, application Japan, Nov. 11, 1985, 60-252517
Int. Cl.[4] G03G 5/04, 5/06
U.S. Cl. 430—73 **12 Claims**

1. An electrophotographic photoreceptor comprising a conductive support having formed thereon a photosensitive layer containing a styryl dye represented by formula (I)

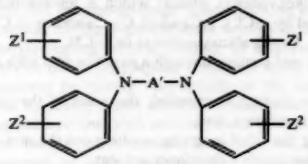


wherein A represents

O, S, Se or

R^2 represents a hydrogen atom, a substituted or unsubstituted alkyl group, an alkoxy group, an aryloxy group, a nitro group, or a halogen atom; R^3, R^4 and R^5 each represents a hydrogen atom or a substituted or unsubstituted alkyl group; R^1 represents a substituted or unsubstituted alkyl grup; Ar and Ar' each represents a substituted or unsubstituted aryl group; the substituent of the substituted alkyl group as represented by R^1 or R^2 or the substituted aryl group as represented by Ar or Ar' is selected from an alkyl group, a halogen atom, a cyano group, a nitro group, a trifluoromethyl group, an alkoxycarbonyl group, a substituted carbonyloxy group, a carbonyl group, an alkoxy group, an amido group, and a sulfonamido group; Y represents a hydrogen atom, an alkyl group, a halogen atom, a cyano group, a nitro group, a trifluoromethyl group, an alkoxycarbonyl group, an alkyl-substituted carbonyloxy group, a carbonyl group, an alkoxy group, an amido group, or a sulfonamido group; X^- represents an anion; and n and m each represents 1 or 2,

and an organic photoconductive compound represented by formula (II)



(II)

wherein Z^1 and Z^2 each represents a hydrogen atom, an alkyl group having from 1 to 4 carbon atoms or a halogen atom; and A' represents a monocyclic divalent aromatic group, a condensed or linearly bonded polycyclic divalent aromatic group, a divalent aromatic group having a condensed heterocyclic ring or a substituted divalent aromatic group of any of the above-described types, wherein the substituent is selected from an acyl group having from 1 to 6 carbon atoms, an alkyl group having from 1 to 6 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms, a nitro group, and a halogen atom.

4,708,923

CROSSLINKED VINYL POLYMER PARTICLES AND ELECTROGRAPHIC ELEMENTS AND LIQUID DEVELOPERS CONTAINING SUCH PARTICLES

Drewfus Y. Myers, Jr.; Peter S. Alexandrovich; Glenn T. Pearce; Domenic Santilli; Chandrasekha Sreekumar; Mart[illegible] A. Berwick; Donald A. Upson, and William K. Goebel[illegible], Rochester, N.Y., assignors to Eastman Kodak Co[illegible], Rochester, N.Y.

Filed Apr. 30, 1986, Ser. No. 858,464

Int. Cl.[4] G03G *9/18*

U.S. Cl. 430—112 **27 Claims**

1. A plurality of polymeric particles, each particle having an average diameter less than one micrometer and comprising a crosslinked vinyl addition copolymer obtainable by aqueous emulsion polymerization of a mixture of monomers wherein:

1.5–15 percent by weight of the mixture of monomers comprises polyfunctional vinyl addition-polymerizable monomers in order to form crosslinking structural units in the copolymer;

85–98.5 percent by weight of the mixture of monomers comprises monofunctional vinyl addition-polymerizable monomers selected such that:

A. 0–98.5 percent by weight of the mixture of monomers comprises monofunctional monomers, the homopolymers of which would be insoluble in but swellable by an isoparaffinic hydrocarbon liquid;

B. From 0 to less than 85 percent by weight of the mixture of monomers comprises monofunctional monomers, the homopolymers of which would be soluble in the isoparaffinic hydrocarbon liquid; and

C. 0–60 percent by weight of the mixture of monomers comprises monofunctional monomers, the homopolymers of which would be insoluble in and not swellable by the isoparaffinic hydrocarbon liquid;

with the provisos that:

I. if more than 0 percent by weight of the mixture of monomers comprises the monomers of part C., above, then more than 0 percent by weight of the mixture of monomers comprises the monomers of part B., above;

II. if more than 9 percent by weight of the mixture of monomers comprises the monomers of part C., above, then less than 10 percent by weight of the mixture of monomers comprises the monomers of part A., above; and

III. all of the polyfunctional and monofunctional monomers and amounts thereof are selected such that the copolymer would be insoluble in the isoparaffinic hydrocarbon liquid but would be swellable in that liquid.

4,708,924

PRESSURE FIXABLE MICROCAPSULE TYPE TONER

Tatsuo Nagai; Shinichi Suzuki, and Hiroshi Yamazaki, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 582,531, Feb. 22, 1984, abandoned. This application Dec. 26, 1985, Ser. No. 813,618

Claims priority, application Japan, Mar. 2, 1983, 58-32850

Int. Cl.[4] G03G *9/00*

U.S. Cl. 430—138 **19 Claims**

1. A pressure fixable microcapsule type toner comprising a core material and an outer wall covering over said core material,

said core material comprising a combination of (i) a substance

(a) having a glass transition point within the range of from −90° C. to 5° C. or a mixed substance system (a') having a glass transition point as the whole system within the range of from −90° C. to 5° C. with (ii) a substance (b) having a softening point within the range of from 25° C. to 180° C. or a mixed substance system (b') having a softening point as the whole system within the range of from 25° C. to 180° C.; said substance (i) being in an amount of 60 to 90% by weight of said core material; and

said outer wall comprising a polymeric covering resin.

4,708,925

PHOTOSOLUBILIZABLE COMPOSITIONS CONTAINING NOVOLAC PHENOLIC RESIN

Stephen Newman, Bishops Stortford, England, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

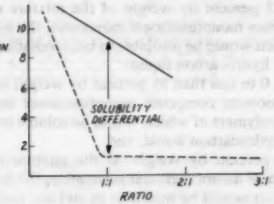
Continuation of Ser. No. 680,486, Dec. 11, 1984, abandoned. This application Jul. 8, 1986, Ser. No. 883,175

Int. Cl.[4] G03C *1/76*

U.S. Cl. 430—270 **14 Claims**

1. A radiation-sensitive composition comprising an alkali-soluble novolac phenolic resin and a radiation-sensitive onium salt, characterised in that the composition is photosolubilisable and that the onium salt is selected from the class consisting of

iodonium, sulphonium, phosphonium, bromonium, chloronium, oxysulphoxonium, oxysulphonium, sulphoxonium, selenonium, telluronium and arsonium salts and the onium salt is present in an amount from 1 to 40% by weight of the total weight of phenolic resin and onium salt, the interaction of the



phenolic resin and onium salt producing an aqueous solvent resistant composition to which is restored the alkali-solubility of the phenolic resin upon the photolytic decomposition of the onium salt, all the resin within said composition being without acetal or ketal groups necessary to photosolubilise the composition.

4,708,926

PROCESS FOR PREPARING RELIEF IMAGES USING ACID-CURABLE RESINS AND MASKED CURING CATALYSTS

Rudolf Kirchmayr, Marly, and Werner Rutsch, Fribourg, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 682,451, Dec. 17, 1984, Pat. No. 4,636,575, which is a division of Ser. No. 455,173, Jan. 3, 1983, Pat. No. 4,510,290. This application Sep. 24, 1986, Ser. No. 910,709

Claims priority, application Switzerland, Jan. 11, 1982, 123/82; Aug. 31, 1982, 5174/82

Int. Cl.[4] G03F *7/02;* **B05D** *3/06*

U.S. Cl. 430—306 **1 Claim**

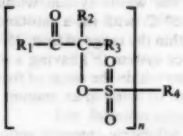
1. A process for the production of a relief image which comprises

(a) coating a substrate with a curable composition which comprises

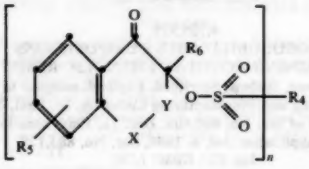
(1) an acid-curable resin which is an amino resin or a phenolic resin, or a mixture of an amino resin or a phenolic resin with an alkyd, polyester or acrylic resin, and

(2) an effective amount of a curing catalyst which is a compound of formula I or II

I



II



in which n is the number 1 or 2 and R_1 is phenyl or naphthyl which is unsubstituted or substituted by 1, 2 or 3 radicals belonging to the group comprising —Cl, —Br, —CN, —NO_2, C_1–C_{12}-alkyl, C_1–C_4-alkoxy, phenoxy, tolyloxy, phenylthio, tolylthio, C_1–C_8-alkylthio, —SCH_2CH_2OH, C_1–C_4-alkylsulfonyl, phenylsulfonyl, C_2–C_4-alkoxycarbonyl, C_1–C_4-alkylamino, C_2–C_4-dialkylamino, phenyl—CONH, C_1–C_4-alkyl—CONH— or benzoyl, or R_1 is also anthryl, phenanthryl, thienyl, pyridyl, furyl, indolyl or tetrahydronaphthyl, and R_2 is hydrogen or C_1–C_8-alkyl which is unsubstituted or substituted by —OH, —Cl, C_1–C_4-alkoxy, —CN, C_2–C_5-alkoxycarbonyl, phenyl, chlorophenyl, C_7–C_{10}-alkylphenyl or C_7–C_{10}-alkoxyphenyl, or is also benzoyl, R_3 is as defined for R_2 and is also phenyl which is unsubstituted or substituted by —Cl, C_1–C_4-alkyl, C_1–C_4-alkoxy or C_1–C_4-alkylthio, C_2–C_8-alkoxycarbonyl, —CN, C_1–C_4-alkyl—NHCO—, phenyl—NHCO— or —$CONH_2$, or R_2 and R_3, together with the carbon atom to which they are attached, constitute a C_4–C_6-cycloalkyl ring, X is —O—, —S—, —SO_2—, —CH_2—, —$C(CH_3)$— or >N—COR_7, R_7 being C_1–C_4-alkyl or phenyl, and Y is a direct bond or —CH_2—, and, if n = 1, R_4 is C_1–C_{18}-alkyl, phenyl which is unsubstituted or substituted by halogen, C_1–C_{12}-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkyl—CONH—, phenyl—CONH—, —NO_2 or benzoyl, naphthyl which is unsubstituted or substituted by halogen, C_1–C_{12}-alkyl or C_1–C_4-alkoxy, C_5–C_6-cycloalkyl, C_7–C_9-aralkyl, camphoryl, —CF_3' —CCl_3, —F or —NH_2, and, if n = 2, R_4 is a —$(CH_2)_m$— group in which m is the number 2 to 8, or R_4 is phenylene or naphthylene which is unsubstituted or substituted by C_1–C_{12}-alkyl, R_5 is H or 1, 2 or 3 radicals belonging to the group comprising —Cl, —Br, —NO_2, C_1–C_{12}-alkyl, C_1–C_{12}-alkoxy, phenoxy, phenylthio, C_1–C_8-alkylthio or —SCH_2CH_2OH, and R_6 is hydrogen or C_1–C_8-alkyl which is unsubstituted or substituted by —OH, —Cl, C_1–C_4-alkoxy, —CN, C_2–C_5-alkoxycarbonyl, phenyl, chlorophenyl, C_7–C_{10}-alkylphenyl or C_7–C_{10}-alkoxyphenyl, phenyl which is unsubstituted or substituted by —Cl, C_1–C_4-alkyl, C_1–C_4-alkoxy or C_1–C_4-alkylthio, C_2–C_8-alkoxycarbonyl or —CN,

(b) irradiating said coating through a negative film with short-wave light,

c) heating the coating to crosslink the areas of the coating exposed to irradiation, and

(d) developing the relief image by washing out the non-cross-linked portions with a developer solvent.

4,708,927

PHOTOGRAPHIC ELEMENTS WITH DEVELOPMENT INHIBITOR PRECURSOR

Hisashi Okamura; Hiroshi Kawamoto, and Yoshio Sakakibara, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

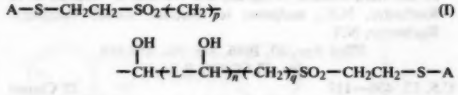
Filed Apr. 10, 1986, Ser. No. 851,052

Claims priority, application Japan, Apr. 11, 1985, 60-77302

Int. Cl.[4] G03C *5/54, 1/40*

U.S. Cl. 430—564 **12 Claims**

1. A photographic element which comprises a light-sensitive element including a light-sensitive silver halide emulsion layer coated on a support, wherein said silver halide emulsion layer or other photographic layers contain at least one development inhibitor precursor represented by formula (I)



(I)

wherein A represents a phenyl group or a 5- or 6-membered nitrogen-containing heterocyclic ring group; L represents a chemical bond or divalent linking group; p and q each represents an integer of 1 or 2; and n represents 0 or 1.

4,708,928

PHOTOTHERMOGRAPHIC ELEMENT COMPRISING PARTICLES EACH CONTAINING SILVER HALIDE, A SILVER COMPOUND AND REDUCING AGENT

Thomas C. Geisler, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 29, 1986, Ser. No. 902,208
Int. Cl.[4] G03C *1/06*
U.S. Cl. 430—619 **21 Claims**

1. A photothermographic active particle having dimensions between 0.5 and 100 microns comprising a transparent binder, photosensitive silver halide, light insensitive silver compound, and a reducing agent for silver ion.

4,708,929

METHODS FOR PROTEIN BINDING ENZYME COMPLEMENTATION ASSAYS

Daniel R. Henderson, Benicia, Calif., assignor to Microgenics Corporation, Concord, Calif.

Continuation-in-part of Ser. No. 666,080, Oct. 29, 1984, which is a continuation-in-part of Ser. No. 585,356, Mar. 1, 1984, abandoned. This application Apr. 8, 1985, Ser. No. 721,267
Int. Cl.[4] G01N *33/53, 33/532;* **C12N** *9/96;* **A01N** *63/02*
U.S. Cl. 435—7 **4 Claims**

1. An enzyme assay method for determining the amount of a suspected analyte in a sample which comprises the steps of:

(a) Forming a reaction mixture by combining in a medium (1) sample; (2) an enzyme-donor polypeptide conjugate; (3) an analyte-binding protein specific for said analyte; and (4) an enzyme-acceptor polypeptide consisting essentially of a fragment of β-galactosidase, wherein said enzyme-donor polypeptide conjugate and enzyme acceptor polypeptide are prepared by recombinant DNA techniques or chemical polypeptide synthesis techniques, wherein said enzyme-donor polypeptide is characterized by forming with said enzyme-acceptor polypeptide, an active enzyme complex having β-galactosidase activity in the absence of analyte-binding protein binding to said conjugate, said enzyme donor polypeptide conjugate being further characterized by having substantially as the internal amino acid sequence, amino acids 6-51 of β-galactosidase, having one cysteine, with analyte joined to said one cysteine, and having an N-terminal sequence and a C-terminal sequence or having substantially as the amino acid sequence amino acids 7-44 of β-galactosidase, having one cysteine with analyte joined to said one cysteine and having at least an N-terminal sequence and (5) a substrate capable of reacting with said active enzyme complex, such that the rate of conversion by said active enzyme complex can be monitored; and wherein said enzyme-donor conjugate is capable of competitively binding to the analyte-binding protein inhibiting the formation of active enzyme complex;

(b) measuring the rate of conversion of substrate in the reaction mixture; and

(c) determining the amount of analyte in the sample by comparing the rate of conversion of substrate to a rate of conversion of substrate obtained using a known concentration of the analyte.

4,708,930

MONOCLONAL ANTIBODY TO A HUMAN CARCINOMA TUMOR ASSOCIATED ANTIGEN

Kenneth H. Kortright, Cooper City, and David E. Hofheinz, Homestead, both of Fla., assignors to Coulter Corporation, Hialeah, Fla.

Continuation-in-part of Ser. No. 670,328, Nov. 9, 1984, abandoned. This application Feb. 15, 1985, Ser. No. 702,059
Int. Cl.[4] G01N *33/577, 33/574, 33/541, 33/546;* **A61K** *49/00;* **C12N** *5/00;* **C07K** *15/04*
U.S. Cl. 435—7 **38 Claims**

11. A monoclonal antibody which specifically binds to an antigen on the surface or in the cytoplasm of human carcinoma tissue, said antigen being further characterized in that

a. It has a molecular weight in the range of 380,000–450,000 as determined by carrying out electrophoresis on the antigen and comparing its movement with that of marker proteins of known molecular weight,

b. It may be expressed in a slightly larger form found only in the cytoplasm and it has a molecular weight in the range of 480,000–510,000 daltons as determined by said electrophoresis method, and

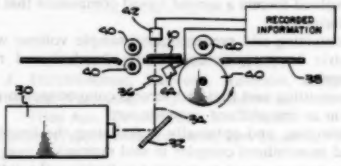
c. It is essentially undetectible on normal human tissue.

4,708,931

LAMINATED ROD HAVING ALTERNATING DETECTION AND SPACER LAYERS FOR BINDING ASSAYS

Clifford N. Christian, Costa Mesa, Calif., assignor to Regents of University of California, Berkeley, Calif.

Division of Ser. No. 616,395, Jun. 1, 1984, which is a continuation-in-part of Ser. No. 526,970, Aug. 26, 1983, abandoned. This application Apr. 29, 1985, Ser. No. 728,600
Int. Cl.[4] G01N *33/53, 33/543, 35/00*
U.S. Cl. 435—7 **18 Claims**



1. An assay rod adapted for use in the detection of the presence of substances in test solution which engage in binding reactions comprising:

a laminated rod structure comprising a plurality of alternating detection layers and spacer layers, at least one of said detection layers including a known binding reagent bound thereto, said binding reagent being capable of specifically binding with one of said substances being tested for and said binding reagent being present in said detection layer in an amount sufficient to bind said substance to said detection layer to thereby provide for detection of the presence of said substance in said test solution; and

means for adhering said detection layers to the spacer layers to provide said laminated rod structure.

8. A method for detecting the presence of substances in a test solution comprising the steps of:

providing an assay rod according to claim 1;

applying said test solution to said assay rod in a sufficient amount and for a sufficient time to allow binding reaction of said binding reagent with any of said substance in said test solution; and

detecting the presence of any of said substance which is bound to said binding reagent.

4,708,932

METHOD AND DEVICE FOR BIOSPECIFIC AFFINITY REACTIONS

Rolf E. Axén, Bälinge; Göran L. Kaj, Upsala, and Rune Björkman, Bälinge, all of Sweden, assignors to Pharmacia AB, Upsala

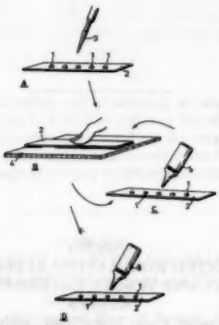
PCT No. PCT/SE84/00033, § 371 Date Sep. 28, 1984, § 102(e) Date Sep. 28, 1984, PCT Pub. No. WO84/03150, PCT Pub. Date Aug. 16, 1984

PCT Filed Feb. 2, 1984, Ser. No. 656,976

Claims priority, application Sweden, Feb. 2, 1983, 8300553

Int. Cl.[4] G01N *33/52, 33/53, 33/544;* **C12N** *11/04*

U.S. Cl. 435—7 **13 Claims**



1. In a method of performing analyses based upon biospecific reactions in heterogeneous systems, comprising the steps of

(a) providing a self-supporting carrier matrix body capable of absorbing and retaining liquid and having a first receptor component immobilized to the pore surfaces thereof,

(b) sampling a predetermined volume of a liquid having dissolved therein a second ligand component that is to be determined,

(c) contacting said predetermined sample volume with the matrix bocy to be completely absorbed and retained thereby,

(d) permitting said first and second components to react to form an immobilized complex, and

(e) detecting, and optionally quantitating the formation of said immobilized complex in said matrix,

(f) the improvement comprising optimizing the total reaction rate of said second component with said first component by providing said first receptor component covalently bonded to the pore surfaces of said matrix in a sufficient amount for said total reaction rate to be dependent on the diffusion of said second component in the liquid phase, and by minimizing the influence of said diffusion by selecting the pore dimensions of said matrix body so that the total diffusion process therein substantially corresponds to that of a matrix having cylindrical pores with a diameter of less than about 200 μm, but sufficiently large to permit easy passage of the reagents, to thereby make said total reaction rate substantially independent of said diffusion.

4,708,933

IMMUNOLIPOSOME ASSAY-METHODS AND PRODUCTS

Leaf Huang, 352 Dominion Cir., Knoxville, Tenn. 37922, and Rodney J. Y. Ho, 1611 Laurel Ave., Knoxville, Tenn. 37916

Filed Jun. 12, 1984, Ser. No. 619,844

Int. Cl.[4] G01N *33/543, 33/544, 33/545, 33/552*

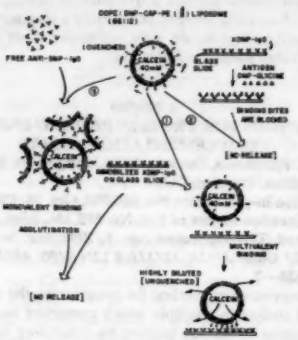
U.S. Cl. 435—7 **39 Claims**

1. An immunoassay method for detecting or quantifying an analyte of interest in a test fluid, said method comprising:

(a) forming liposomes having the analyte of interest incorporated onto the surface membrane thereof and a marker compound incorporated in the interior aqueous phase thereof;

(b) providing a solid phase inert support having attached thereto a receptor for the analyte of interest;

(c) mixing said test fluid with said receptor-solid phase support of step (b) for sufficient time to saturate said receptor with any analyte present in said test fluid;



(d) mixing said liposomes formed in step (a) with said saturated receptor-solid phase support from step (c) causing the lysis of said liposomes, without the addition of any membrane lytic molecules, ions, or active complements, and;

(e) determining the presence of marker compound released by the liposomes in step (d).

4,708,934

α-AMIDATION ENZYME

James P. Gilligan, Elizabeth, and Barry N. Jones, Bloomingdale, both of N.J., assignors to Unigene Laboratories, Inc., Fairfield, N.J.

Filed Sep. 27, 1984, Ser. No. 655,366

Int. Cl.[4] C12P *21/00, 21/06, 21/02;* **C12N** *9/80, 15/00*

U.S. Cl. 435—68 **7 Claims**

1. A method of preparing an alpha-amidated peptide or polypeptide from a peptide or polypeptide substrate having a terminal glycine residue having an alpha-carboxyl group comprising reacting said substrate in the presence of an enzymatically effective amount of a purified enzyme preparation containing peptidyl-glycine alpha-amidating monooxygenase, PAM, said substrate purified from natural sources or produced by recombinant DNA techniques and said enzyme preparation capable of amidating the alpha-carboxyl group of the substrate, said preparation having a specific enzymatic activity of at least 25 mU/mg protein (as measured by the conversion of Dansyl-D-Tyr-Val-Gly-COOH to Dansyl-D-Tyr-Val-$CONH_2$ at 37° C. and pH 7) and being substantially free of other proteolytic enzymes which degrade the peptide, the polypeptide, the amidated peptide or the amidated polypeptide, or PAM,

wherein the purified enzyme preparation is prepared by a process comprising:

(a) subjecting a PAM containing composition obtained from a medullary thyroid carcinoma tissues, cell lines thereof, or tissue culture media from such cell lines to anion exchange chromatography and then size exclusion chromatography to produce a PAM containing eluant fraction; and

(b) subjecting the eluant fraction to strong anion exchange chromatography to produce the purified enzyme preparation.

4,708,935

(2-5')-OLIGO (3'-DEOXYADENYLATE) AND DERIVATIVES THEREOF

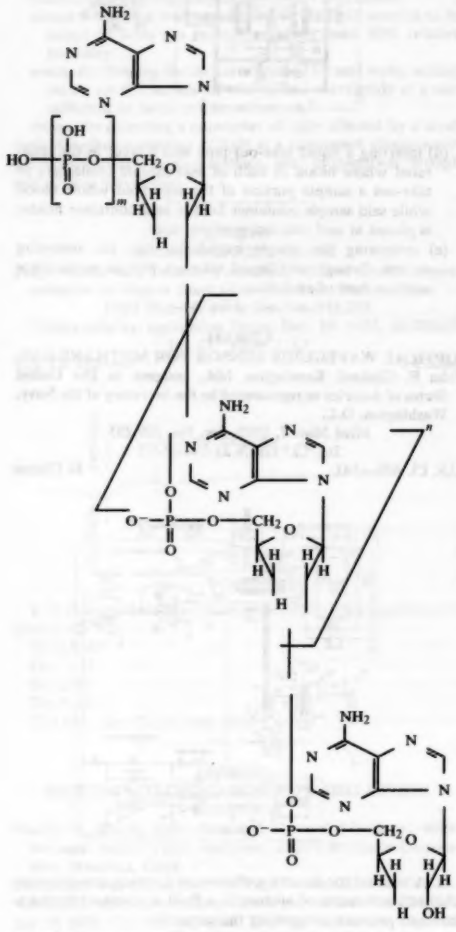
Robert J. Suhadolnik, Roslyn, Pa.; Joseph M. Wu, Mohegan Lake, N.Y.; Paul Doetsch, Beltsville, Md., and Earl E. Henderson, Elkins Park, Pa., assignors to Research Corporation, New York, N.Y.

Division of Ser. No. 605,004, Apr. 27, 1984, Pat. No. 4,539,313, which is a division of Ser. No. 252,926, Apr. 10, 1981, Pat. No. 4,464,359. This application Mar. 29, 1985, Ser. No. 717,709

Int. Cl.[4] C12P *19/34, 19/36;* C12N *9/12*

U.S. Cl. 435—91 6 Claims

1. A method of preparing a compound of the formula



wherein m is 0, 1, 2 or 3 and n is 0, 1, 2, 3 or 4, wherein m is other than 0 which comprises incubating 3'-deoxyadenosine triphosphate with adenosine triphosphate: (2'-5') oligo(adenosine)adenyltransferase (EC 2.7.7.-) bound to an inert support carrying double stranded polynucleotide.

4,708,936

PROCESS FOR THE CONTINUOUS PRODUCTION OF L-CARNITINE

Hans Kulla, Visp; Pavel Lehky, Naters, and Armand Squaratti, Brig, all of Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

Filed Mar. 29, 1985, Ser. No. 717,546

Claims priority, application Switzerland, Feb. 27, 1985, 890/85

Int. Cl.[4] C12P *13/00, 13/01*

U.S. Cl. 435—128 22 Claims

1. A process for the continuous production of L-carnitine comprising cultivating a microorganism of the strain *Achromobacter xylosoxydans* DSM 3225 (HK 1331b) type in a bioreactor with crotonobetaine and/or γ-butyrobetaine in the presence of a growth substrate, passing the culture fluid outside of the bioreactor in a circulation in which a separation of the cell is carried out, whereby a quantity of cell-free solution, which is as large as the amount fed to the bioreactor as a substrate, is withdrawn from the bioreactor, and separating the L-carnitine from the cell-free solution.

4,708,937

PURIFIED MIGRATION INHIBITORY FACTOR ALSO HAVING COLONY STIMULATING FACTOR ACTIVITY

Heinz G. Remold, Brookline, Mass., assignor to Brigham & Women's Hospital, Boston, Mass.

Filed Oct. 15, 1984, Ser. No. 660,861

Int. Cl.[4] C12N *9/96*

U.S. Cl. 435—188 5 Claims

1. Purified human migration inhibitory factor (MIF) and diagnostically acceptable salts and derivatives thereof, said MIF and said salts and derivatives thereof having (a) colony stimulating activity and (b) a specific activity greater than 1×10^4 units/mg.

2. The MIF of claim 1 in detectably labeled form.

4. The detectably labeled MIF of claim 2 wherein said detectable label is an enzyme label.

4,708,938

ALCOHOLIC FERMENTATION

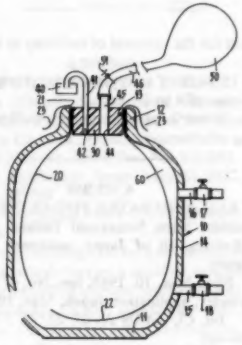
Stephen J. Hickinbotham, Burwood, Australia, assignor to Hickinbotham Winemakers Pty. Ltd., Burwood, Australia

Filed Apr. 23, 1985, Ser. No. 726,158

Claims priority, application Australia, Apr. 30, 1984, PG4757; Jan. 10, 1985, PG8843

Int. Cl.[4] C12M *1/12*

U.S. Cl. 435—311 7 Claims



1. Fermentation apparatus comprising a rigid container having an open top, a liquid transfer inlet positioned adjacent the base of the container and a liquid transfer outlet positioned

adjacent the top of the container, valve means to control flow of liquid in and out of the inlet and outlet, an air impervious plastic bag located within the container to hang from the open top, and configured to define a chamber between the exterior of the bag and the interior of the container, and means for sealing the top, said sealing means including a delivery outlet and filter means positioned across the top of the container wherein in preparing an alcoholic beverage a fermentation mixture is placed within the bag and the bag sealed, and by use of the valve means a temperature controlling medium is circulated into the chamber via the inlet and outlet to cause the bag to assume the volume of its contents and to control the temperature at which fermentation takes place, and when fermentation is complete, the chamber is pressurized to force the liquid within the bag to be expelled through the filter means and via the delivery outlet.

4,708,939

PROCESS AND REAGENT FOR THE COMPLETE AND RAPID REMOVAL OF A TURBIDITY IN A BIOLOGICAL FLUID

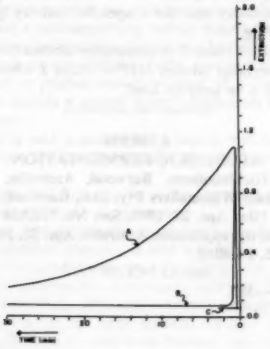
Joachim Siedel, Bernried; Johnny Staepels, and Joachim Ziegenhorn, both of Starnberg, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Division of Ser. No. 626,633, Jul. 2, 1984, Pat. No. 4,579,825. This application Dec. 2, 1985, Ser. No. 803,496

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1983, 3323949

Int. Cl.[4] G01N *31/00*

U.S. Cl. 436—13 **10 Claims**



1. An agent for the removal of turbidity in a biological fluid, comprising

(a) 0.5 to 15 wt.% of a polyethoxylated triglyceride with an HLB value of 4 to 14, and

(b) 0.5 to 10 wt.% of a secondary n-alkane sulphonate in aqueous solution.

4,708,940

METHOD AND APPARATUS FOR CLINICAL ANALYSIS

Kasumi Yoshida, Mito; Nobuyoshi Takano, and Naoya Ono, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 10, 1983, Ser. No. 473,867

Claims priority, application Japan, Mar. 10, 1982, 57-36462

Int. Cl.[4] G01N *21/07, 21/11, 37/00*

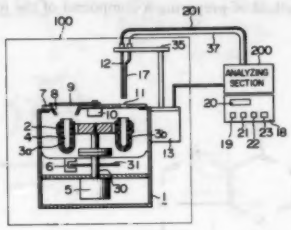
U.S. Cl. 436—45 **23 Claims**

1. A method for clinical analysis comprising the steps of:

(a) rotating a rotor intermittently at a low speed to adjust each of a plurality of container holders connected to said rotor at a first position and inserting a sample container containing whole blood therein in one of said container holders;

(b) rotating said rotor at a high speed so as to direct the bottom of each of said sample containers outward centrifugally to separate the whole blood contained in said sample containers;

(c) rotating said rotor intermittently at a low speed to adjust repetitively each of said sample containers at a second position for taking-out a portion of the separated whole blood;



(d) inserting a liquid take-out pipe into a layer in the separated whole blood in each of said sample containers to take-out a sample portion of the separated whole blood while said sample container held in said container holder is placed at said take-out position; and

(e) measuring the sample introduced into the analyzing section through said liquid take-out pipe in accordance with an item of analysis.

4,708,941

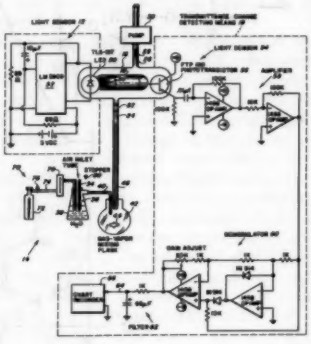
OPTICAL WAVEGUIDE SENSOR FOR METHANE GAS

John F. Giuliani, Kensington, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 7, 1985, Ser. No. 709,251

Int. Cl.[4] G01N *21/17, 21/75*

U.S. Cl. 436—141 **32 Claims**



1. A method for detecting alkanes by forming and detecting clathrate structures of alkanes in a fluid at constant temperature and pressure comprising the steps of:

propagating light into an optical capillary waveguide having two ends and a longitudinal surface at end thereof which is closed with an optical stopper and with the other end thereof sealed with a lens-like curvature;

obtaining samples of a fluid to be tested;

hydrating any alkanes present in said fluid samples to be

tested to yield gas mixtures with at least 30% relative humidity;

condensing any hydrated alkanes on the surface of said optical waveguide; and

detecting alkanes in the fluid to be tested by detecting a parameter of light affected by weak optical surface scattering of light at any condensed alkane-water-optical surface interfaces after propagation through said optical waveguide.

15. An optical detection device for detecting alkanes by forming and detecting clathrate structures of alkanes in a fluid at constant temperature and pressure, comprising;

a light source;

an optical capillary waveguide having two ends and a surface, with light from the light source directed into said capillary at one end thereof which is closed with an optical stopper and with the other end thereof sealed with a lens-like curvature;

means for obtaining samples of a fluid to be tested;

means for adding water molecules to the fluid samples to be tested to form gas mixtures with at least 30% relative humidity;

means for flowing the mixtures formed by said water adding means on the surface of said optical waveguide at a rate sufficient to favor condensation; and

means for detecting a parameter of light affected by a weak optical surface scattering of light at a condensed alkane-water optical waveguide surface inteface, after propagation through said otpical waveguide.

4,708,942

CHALCOGENIDE GLASS

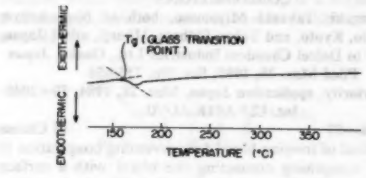
Junji Nishii, and Takashi Yamagishi, both of Osaka, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Dec. 12, 1986, Ser. No. 941,210

Claims priority, application Japan, Dec. 16, 1985, 60-282659

Int. Cl.[4] C03C *3/32*

U.S. Cl. 501—40 3 Claims



1. A chalcogenide glass having the following composition in atomic %:

Tl: 0.5–47

Ge: 5–41

Se: 2–58

Te: 5–75

Tl+Ge+Se+Te: at least 80%.

4,708,943

SILICON NITRIDE HAVING LOW DIELECTRIC CONSTANT

Martin Y. Hsieh, Palo Alto, and Howard Mizuhara, Hillsborough, both of Calif., assignors to GTE Products Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 749,329, Jun. 27, 1985, Pat. No. 4,642,299, which is a continuation-in-part of Ser. No. 721,118, Apr. 8, 1985, Pat. No. 4,654,315. This application Sep. 15, 1986, Ser. No. 906,879

Int. Cl.[4] C04B *35/58;* H01Q *1/42*

U.S. Cl. 501—98 2 Claims

1. A sintered silicon nitride based ceramic dielectric of at least 96% theoretical density comprising a sintering aid, a low dielectric loss promoter, balance silicon nitride and which consists of from about 2% by weight to about 10% by weight of magnesium oxide as the sintering aid, said weight being effective to achieve said theoretical density, said ceramic dielectric containing a low dielectric loss promoter at a level of from about 0.1% to about 2.0% by weight, said low dielectric loss promoter being selected from the group consisting of iron oxide and chromium oxide, said low dielectric loss promoter being effective to provide a low dielectric constant and a low loss tangent that remains essentially unchanged through the temperature range of from about 25° C. to about 1100° C., the dielectric constant being below about 7.0 at about 9.375 gigahertz throughout said temperature range, the loss tangent being less than about 0.003 throughout said temperature range.

4,708,944

PROTEASE ADSORBENT AND PROCESS FOR PURIFYING TPA UTILIZING THE SAME

Tetsuya Someno; Kazuo Kato; Yasushi Takahashi, all of Saitama; Shinichi Ishii, Hokkaido; Tomio Takeuchi, and Hamao Umezawa, both of Tokyo, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 28, 1985, Ser. No. 749,713

Claims priority, application Japan, Jul. 6, 1984, 59-138924

Int. Cl.[4] B01J *37/36*

U.S. Cl. 502—7 4 Claims

1. A tissue plasminogen activator adsorbent wherein valylglycyl-argininal is bound to a water-insoluble carrier.

4,708,945

CATALYSTS COMPRISING SILICA SUPPORTED ON A BOEHMITE-LIKE SURFACE, THEIR PREPARATION AND USE

Lawrence L. Murrell, South Plainfield, and Nicholas C. Dispenziere, Jr., Wall, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Dec. 31, 1985, Ser. No. 815,220

Int. Cl.[4] B01J *21/12*

U.S. Cl. 502—263 7 Claims

5. Composition comprising silica and gamma alumina wherein an amorphous, disordered alumina phase is supported on the external surface of the gamma alumina, and wherein said silica is supported on said amorphous, disordered phase.

4,708,946

CATALYST FOR PURIFYING EXHAUST GAS

Tomohisa Ohata, Himeji; Sadao Terui, Hyogo, and Eiichi Shiraishi, Himeji, all of Japan, assignors to Nippon Shokubai KagAKU Kogyo Co., Ltd., Osaka, Japan

Filed May 21, 1986, Ser. No. 865,882

Claims priority, application Japan, May 23, 1985, 60-109372; Jun. 26, 1985, 60-137784

Int. Cl.[4] B01J *21/04, 23/10, 23/40*

U.S. Cl. 502—304 25 Claims

1. A catalyst for plurifying exhaust gas, having deposited on a monolithic honeycomb carrier a catalyst composition comprising an alumina-modified cerium oxide obtained by impregnating a water-insoluble cerium compound with an aqueous solution of at least one member selected from the group consisting of water-soluble aluminum compounds and alumina hydrates and calcining the product of impregnation, at least one precious metal selected from the group consisting of platinum, palladium, and rhodium, and active alumina.

4,708,947

WATER RESISTANT COMPOSITION AND HEAT-SENSITIVE RECORDING SHEET CONTAINING THE SAME

Hitoshi Maruyama, Kurashiki; Isao Ono, Asakuchi; Hiroji Kohno; Junnosuke Yamauchi, both of Kurashiki, and Takuji Okaya, Nagaokakyo, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Jan. 2, 1986, Ser. No. 815,468

Claims priority, application Japan, Jan. 10, 1985, 60-2967; Jan. 10, 1985, 60-2968; Mar. 15, 1985, 60-52820; Mar. 15, 1985, 60-52822

Int. Cl.[4] B41M *5/18*

U.S. Cl. 503—209 28 Claims

1. A heat-sensitive recording sheet comprising a support having provided thereon with a heat-sensitive color forming layer, wherein (A) polyvinyl alcohol, (B) a chitosan of which aqueous 1% solution has a viscosity not greater than 70 centipoise at 20° C. and (C) an aldehyde compound are incorporated into, or applied onto, said heat-sensitive color forming layer.

4,708,948

SUBSTANTIALLY PURIFIED TUMOR GROWTH INHIBITORY FACTOR

Kenneth K. Iwata, Westbury, N.Y.; Charlotte M. Fryling, Arlington, Va., and George J. Todaro, Seattle, Wash., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Apr. 20, 1984, Ser. No. 602,520

Int. Cl.[4] A61K *37/00*; C07K *15/00*; C12Q *1/18*; C12P *21/00*

U.S. Cl. 514—2 2 Claims

1. Substantially pure polypeptide tumor growth inhibitory factor 1 having the property of inhibiting tumor cell growth without inhibiting TGF-dependent growth of normal rat kidney NRK-49F cells in soft agar and without having antiviral effect, further having the properties of;

(a) being stable to 1M acetic acid at 4 ° C.;

(b) being stable at about 56° C. when exposed for about 30 minutes;

(c) being inhibitory to CCL-64 normal mink lung cells; and

(d) being stimulatory to growth of normal human fibroblasts.

2. Substantially pure polypeptide tumor growth inhibitory factor 2 having the property of inhibiting tumor cell growth without inhibiting TGF-dependent growth of normal rat kidney NRK-49F cells in soft agar and without having antiviral effect, further having the properties of:

(a) being table to 1 M acetic acid at 4° C.;

(b) being stable at about 56° C. when exposed for about 30 minutes;

(c) being non-inhibitory to CCL-64 normal mink lung cells; and

(d) being stimulatory to growth of normal human fibroblasts.

4,708,949

THERAPEUTIC COMPOSITION FROM PLANT EXTRACTS

Yaguang Liu, 67-08 168th St., Fresh Meadows, N.Y. 11365

Filed Sep. 24, 1985, Ser. No. 779,437

Int. Cl.[4] A61K *31/705, 31/70, 31/495, 31/34*

U.S. Cl. 514—26 17 Claims

1. A composition comprising a mixture of:

(a) about 5 to 15% by weight ginsenoside;

(b) about 30 to 50% by weight tetramethyl pyrazine;

(c) about 30 to 50% by weight astragalan; and

(d) about 5 to 15% by weight atractylol.

4,708,950

PHARMACEUTICAL COMPOSITION CONTAINING A DERIVATIVE OF ORTHOAMINOBENZOIC ACID AS AN ACTIVE INGREDIENT

Chikao Yoshikumi, Kunitachi; Yoshio Ohmura, Funabashi; Fumio Hirose, Tokyo; Masanori Ikuzawa, Tachikawa; Kenichi Matsunaga; Takayoshi Fujii, both of Tokyo; Minoru Ohhara, and Takao Ando, both of Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

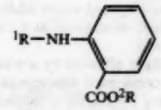
Division of Ser. No. 294,502, Aug. 20, 1981, Pat. No. 4,450,156, which is a division of Ser. No. 84,467, Oct. 12, 1979, Pat. No. 4,322,409, which is a continuation-in-part of Ser. No. 24,092, Mar. 26, 1979, abandoned. This application Jan. 27, 1984, Ser. No. 574,533

Claims priority, application Japan, Apr. 6, 1978, 53-40594

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—42 56 Claims

1. A method for the treatment of hyperlipemia, which comprises administering to a mammal suffering from hyperlipemia, an effective amount of a compound of the formula:



wherein

[1]R denotes one member selected from the group consisting of the residual groups formed by removing OH at 1(alpha) or 1(beta) position from arabinose, xylose, glucose, galactose, rhamnose and mannose, and

[2]R is hydrogen or methyl group,

or a pharmaceutically acceptable salt thereof.

4,708,951

ANTICOAGULATIVE HIGH-MOLECULAR COMPOSITIONS

Hiroshi Inagaki; Takeaki Miyamoto, both of Nagaokakyo; Hiraku Ito, Kyoto, and Tohru Shibata, Himeji, all of Japan, assignors to Daicel Chemical Industries Ltd., Osaka, Japan

Filed Mar. 25, 1985, Ser. No. 715,658

Claims priority, application Japan, Mar. 28, 1984, 59-62048

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—57 15 Claims

9. A method of treating blood for preventing coagulation of said blood comprising contacting the blood with a surface comprising an effective amount of a cellulosic polyelectrolyte complex for imparting anticoagulative properties to said surface, the complex being formed from (1) a polycationic cellulose derivative comprising a reaction product of cellulose or a cellulose derivative having free hydroxyl groups with an aminating agent, or with a quaternary ammonium salt cationizing agent; and (2) a cellulose ether or cellulose ester polyanionic cellulose derivative.

4,708,952

METHOD OF TREATMENT OF THE INFECTIOUS AND VIRAL DISEASES BY ONE TIME INTERFERENCE

Aida Salatinjants, 1333 N. Hobart, Los Angeles, Calif. 90027

Division of Ser. No. 698,837, Feb. 6, 1985. This application Mar. 31, 1986, Ser. No. 846,232

Int. Cl.[4] A61K *31/635, 33/60, 31/715, 31/525*

U.S. Cl. 514—158 4 Claims

1. A composition adapted to prolong the residence time of drugs in the circulating plasma of mammals including humans comprising about 6 parts by weight hexanoic acid, about 48 parts by weight potassium hydrogen tartrate, about 8 parts by weight tannic acid, about 94 parts by weight pectin, about 200 parts by weight of 10% riboflavin, and about 21 parts by weight glutamic acid.

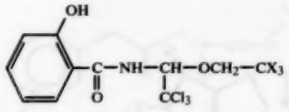
4,708,953

SALICYLAMIDE DERIVATIVES

Yoshio Kurahashi, Hachioji; Kozo Shiokawa, Kawasaki; Toshio Goto, Machida; Shinzo Kagabu, Hachioji; Noboru Matsumoto, Hachioji, and Koichi Moriya, Hachioji, all of Japan, assignors to Nihon Tokushu Noyaku Seizo K.K., Tokyo, Japan

Filed Sep. 10, 1985, Ser. No. 774,272
Claims priority, application Japan, Sep. 13, 1984, 59-190605
Int. Cl.[4] C07C *103/78;* A01N *37/40*
U.S. Cl. 514—166 7 Claims

1. A salicylamide of the formula



in which

X is a halogen atom.

7. A fungicidal composition comprising a fungicidally effective amount of a compound according to claim 1 and a diluent.

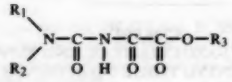
4,708,954

HYPOGYLCEMIC OXALURIC ACID DERIVATIVES

Kazuharu Ienaga; Ko Nakamura, and Akira Ishii, all of Hyogo, Japan, assignors to Nippon Zoki Pharmaceutical Co., Ltd., Osaka, Japan

Filed Feb. 7, 1986, Ser. No. 826,997
Claims priority, application Japan, Feb. 9, 1985, 60-24010
Int. Cl.[4] A61K *31/535;* C07D *295/20*
U.S. Cl. 514—183 11 Claims

9. A method for treating diabetes and diseases caused by diabetes which comprises administering to a subject an effective hypoglycemic amount of an oxaluric acid derivative of the formula (I):



(I)

wherein each of R_1 and R_2, which may be the same or different, is hydrogen, an alkyl group having 1 to 20 carbon atoms or a cycloalkyl group having 3 to 8 carbon atoms; or R_1 and R_2 are joined to form an aziridino, pyrrolidino, piperidino, piperazino or morpholino group with the nitrogen to which they are both attached; and R_3 is hydrogen or an alkyl group having 1 to 20 carbon atoms;

or a pharmaceutically acceptable salt thereof.

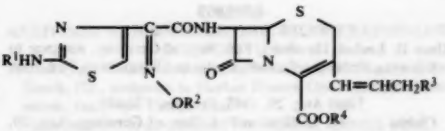
4,708,955

3-(SUBSTITUTED)PROPENYL-7-AMINOTHIAZOLYLCEPHALOSPORANIC ACIDS AND ESTERS THEREOF

Seiji Iimura; Yoshio Abe, both of Tokyo; Jun Okumura, Yokohama; Takayuki Naito, Kawasaki, and Hajime Kamachi, Chiba, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Filed Jun. 24, 1985, Ser. No. 748,359
Int. Cl.[4] A61K *31/545;* C07D *501/22, 501/24*
U.S. Cl. 514—202 62 Claims

1. A compound of the formula



wherein

R^1 is hydrogen or a conventional amino-protecting group,

R^2 is hydrogen, or alkanoyl having 2 to 4 carbon atoms,

R^3 is hydrogen, or lower alkanoyloxy having 2 to 3 carbon atoms, and

R^4 is hydrogen, or a physiologically hydrolyzable ester group with provision that when R^4 is hydrogen at least one of R^2 and R^3 is other than hydrogen.

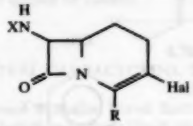
4,708,956

3-POSITION HALOGENATED CEPHALOSPORIN ANALOGS AND PHARMACEUTICAL COMPOSITIONS

Tadashi Hirata, Yokohama; Ikuo Matsukuma, Yokkaichi; Shigeo Yoshiie, Sakai; Kiyoshi Sato, and Yoichi Ohashi, both of Shizuoka, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 807,789, Dec. 12, 1985, abandoned, which is a continuation of Ser. No. 719,640, Apr. 4, 1985, abandoned, which is a continuation of Ser. No. 608,275, May 7, 1984, abandoned, which is a continuation of Ser. No. 389,500, Jun. 17, 1982, abandoned, which is a continuation of Ser. No. 171,297, Jul. 23, 1980, abandoned. This application Aug. 18, 1986, Ser. No. 896,574
Int. Cl.[4] C07D *471/04, 9/65;* A61K *31/495, 31/395*
U.S. Cl. 514—210 18 Claims

1. A carbacephem compound represented by the formula:

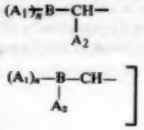


wherein

R is a carboxylic acid or a salt thereof;

Hal represents a halogen atom; and

X represents an acyl group of the formula X_2CO, wherein X_2 is selected from the group consisting of cyanomethyl or a group represented by the formula:



wherein B represents an unsaturated six membered carbocycle, or a five or six membered heterocyclic group wherein the heterocyclic group is monocyclic and selected from the group consisting of heterocyclic groups having 1 to 4N heteroatoms, heterocyclic groups having one S or O heteroatom and heterocyclic groups having one S or O heteroatom and one or two N heteroatoms; A_1 represents a substituent(s) on B selected from the group consisting of hydrogen, hydroxyl, lower alkoxy having 1 to 4 carbons, halo, nitro, amino, aminomethyl, methylsulfonamido and lower acyloxy having 1 to 4 carbons; n is an integer from 0 to 5; and A_2 is selected from the group consisting of hydrogen, amino, hydroxyl, carboxyl and sulfo.

5. A pharmaceutical composition, comprising a carbacephem compound of claim 1 and a pharmacologically acceptable carrier.

4,708,957

INJECTION SOLUTION

Klaus D. Loebel, Hamburg, Fed. Rep. of Germany, assignor to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Aug. 29, 1985, Ser. No. 770,449

Claims priority, application Fed. Rep. of Germany, Aug. 29, 1984, 3432112

Int. Cl.[4] A61K *31/52*

U.S. Cl. 514—264 **18 Claims**

1. An aqueous injectable solution comprising a broncholytically active amount of the 2-hydroxy-N,N,N-trimethylethanaminium salt of 3,7-dihydro- 1,3-dimethyl-1H-purine-2,6-dione (1:1) and 5–8% by weight of propionic acid based on the amount of salt.

4,708,958

6-(IMIDAZOLYPHENYL)-4-IMINOPYRIMIDINONES USEFUL AS HYPOTENSIVE AGENTS

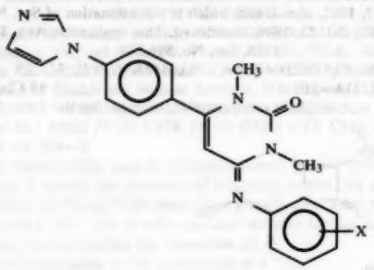
Paul W. Manley, Monks Risborough, United Kingdom, assignor to G. D. Searle & Co., Chicago, Ill.

Filed Sep. 24, 1986, Ser. No. 911,927

Int. Cl.[4] A61K *31/415*; C07D *239/10*

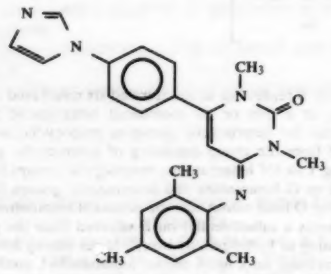
U.S. Cl. 514—274 **4 Claims**

1. A compound of the formula



and the pharmaceutically acceptable salts thereof wherein X represents one to three substituents selected from the group consisting of R, OR, SR, NHR, NR_2, Cl, Br, F, NO_2, $COCH_3$, COOH, COOR, CONHR, $CONR_2$, and OH and wherein R represents lower alkyl having 1–6 carbon atoms.

3. A method of treating hypertension in animals comprising administering to a hypertensive animal a therapeutically effective anti-hypertensive amount of a compound of the formula



and the pharmaceutically acceptable salts thereof wherein X represents one to three substituents selected from the group consisting of R, OR, —SR, —NHR, $-NR_2$, Cl, Br, F, NO_2, $-COCH_3$, —COOH, —COOR, —CONHR, $-CONR_2$, or —OH and wherein R represents lower alkyl having 1–6 carbon atoms.

4,708,959

4,5-TRIMETHYLENE-4-ISOTHIAZOLINE-3-ONES AND THEIR USE AS A BACTERICIDE AND FUNGICIDE AGENT

Braham Shroot, Antibes, and Jean Maignan, Tremblay les Gonesse, both of France, assignors to Centre International de Recherches Dermatologiques (C.I.R.D.), Valbonne, France

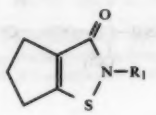
Continuation-in-part of Ser. No. 311,400, Oct. 14, 1981, abandoned. This application Jul. 27, 1983, Ser. No. 517,749

Claims priority, application France, Oct. 17, 1980, 80 22278

Int. Cl.[4] A61K *31/425*; C07D *275/04*

U.S. Cl. 514—373 **17 Claims**

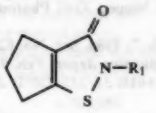
1. A 4,5-trimethylene-4-isothiazoline-3-one having the formula



wherein

R_1 is selected from the group consisting of hydrogen and linear or branched alkyl having from 1 to 12 carbon atoms, and their salts of a mineral or organic acid.

10. A process for preventing or treating infectious bacterial, fungal or acneal diseases of the epidermis comprising administering to a human an effective amount of a 4,5-trimethylene-4-isothiazoline-3-one having the formula:



wherein

R_1 is selected from the group consisting of hydrogen and linear or branched alkyl having 1 to 12 carbon atoms, and its salt of a mineral or organic acid.

4,708,960

N-(ARYLPROPYL)-AZOLYLUREAS, AND FUNGICIDES CONTAINING THESE COMPOUNDS

Costin Rentzea, Heidelberg; Ernst Buschmann, Ludwigshafen; Walter Himmele, Walldorf; Eberhard Ammermann, Ludwigshafen, and Ernst-Heinrich Pommer, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

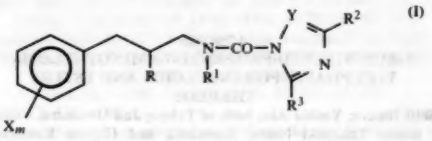
Filed Apr. 18, 1985, Ser. No. 724,585

Claims priority, application Fed. Rep. of Germany, Apr. 21, 1984, 3415139

Int. Cl.[4] A01N *43/50, 43/653*; C07D *233/60, 249/14*

U.S. Cl. 514—383 **4 Claims**

1. An N-(arylpropyl)-azolylurea of the formula

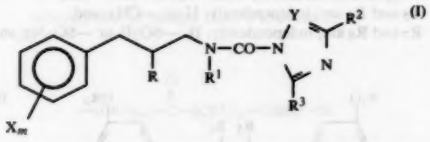


(I)

where R is alkyl of 1 to 4 carbon atoms, X is hydrogen, halogen, nitro, cyano, trifluoromethyl or alkyl, alkoxy or alkylthio, each of which is of 1 to 6 carbon atoms, or phenyl or phenoxy, m is an integer from 1 to 4, the individual groups X being identical or different when m is greater than 1, Y is CH or N,

R^1 is alkyl, alkenyl, alkoxyalkyl, alkylthioalkyl, cycloalkyl or cycloalkylalkyl, each of not more than 12 carbon atoms, 4-methylcyclohexyl, 4-tert.-butylcyclohexyl or 4-methoxycyclohexyl or is phenyl or benzyl, each of which is unsubstituted or substituted by halogen, C_1–C_2-alkyl, C_1–C_4-alkoxy, trifluoromethyl, nitro or cyano, and R^2 and R^3 are identical or different and are each hydrogen or alkyl of 1 to 5 carbon atoms.

3. A process for combatting fungi, wherein the fungi or the materials, areas, plants or seed threatened by fungus attack are treated with a fungicidally effective amount of an N-(arylpropyl)-azolylurea of the formula



(I)

where R is alkyl of 1 to 4 carbon atoms, X is hydrogen, halogen, nitro, cyano, trifluoromethyl or alkyl, alkoxy or alkylthio, each of which is of 1 to 6 carbon atoms, or phenyl or phenoxy, m is an integer from 1 to 4, the individual groups X being identical or different when m is greater than 1, Y is CH or N, R^1 is alkyl, alkenyl, alkoxyalkyl, alkylthioalkyl, cycloalkyl or cycloalkylalkyl, each of not more than 12 carbon atoms, 4-methylcyclohexyl, 4-tert.-butylcyclohexyl or 4-methoxycyclohexyl or is phenyl or benzyl, each of which is unsubstituted or substituted by halogen, C_1–C_4-alkyl, C_1–C_4-alkoxy, trifluoromethyl, nitro or cyano, and R^2 and R^3 are identical or different and are each hydrogen or alkyl of 1 to 5 carbon atoms.

4,708,961

ACYLINDOLE DERIVATIVES AND THEIR USE IN PHARMACEUTICAL COMPOSITIONS

Kazuharu Ienaga, and Ko Nakamura, both of c/o Institute of Bio-Active Science, Nippon Zoki Pharmaceutical Co., Ltd. 442-1, Aza Kawakitayama, Kinashi, Yashiro-cho, Katoh-gun, Hyogo, Japan

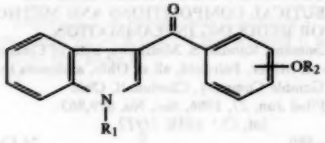
Continuation of Ser. No. 655,472, Sep. 27, 1984, abandoned. This application Oct. 16, 1986, Ser. No. 919,746

Claims priority, application Japan, Sep. 28, 1983, 58-181084; Aug. 11, 1984, 59-168928

Int. Cl.[4] C07D *209/12;* **A61K** *31/40*

U.S. Cl. 514—423 **15 Claims**

1. Acylindole derivatives of the formula (I):



(I)

wherein R_1 is hydrogen, and R_2 is hydrogen, an alkyl group having 1 to 5 carbon atoms, an alkyl group having 1 to 5 carbon atoms containing one or more hydroxy groups, or a group of the formula

in which R_3 is an alkyl group having 1 to 5 carbon atoms, and wherein —OR_2 is substituted at the ortho or para position, and pharmaceutically acceptable salts thereof.

4,708,962

ANTIVIRAL AND ANTITUMOR CYCLOHEXADIENONE COMPOSITIONS

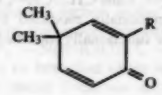
Tatsuo Higa, Okinawa, Japan, and Kenneth M. Snader, Vero Beach, Fla., assignors to Harbor Branch Oceanographic Institution, Inc., Fort Pierce, Fla.

Continuation-in-part of Ser. No. 682,278, Dec. 17, 1984, abandoned, and Ser. No. 744,620, Jun. 14, 1985. This application Sep. 4, 1985, Ser. No. 772,330

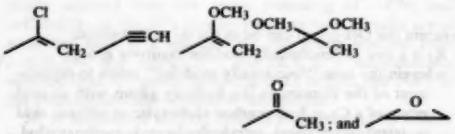
Int. Cl.[4] A61K *31/12;* **C07C** *49/597*

U.S. Cl. 514—475 **11 Claims**

1. A composition according to the general formula:



wherein R is selected from the group consisting of:



6. An antitumor composition comprising, as active ingredient, an effective antitumor amount of one or more of the compositions of claim 1 and a non-toxic pharmaceutically acceptable carrier or diluent.

4,708,963

NOVEL CARBACYCLINS, THEIR PREPARATION AND USE

Werner Skuballa; Bernd Radüchel; Norbert Schwarz; Helmut Vorbrüggen; Jorge Casals-Stenzel; Ekkehard Schillinger, and Michael H. Town, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

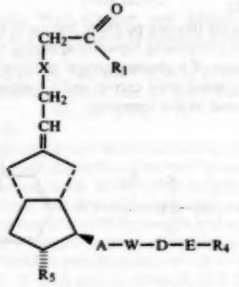
Continuation of Ser. No. 542,961, Oct. 18, 1983, abandoned, which is a division of Ser. No. 333,099, Dec. 21, 1981, Pat. No. 4,423,067. This application May 28, 1985, Ser. No. 738,545

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1980, 3048906

Int. Cl.[4] C07C *177/00;* **A61K** *31/557*

U.S. Cl. 514—530 **7 Claims**

1. A carbacyclin derivative of the formula:



wherein

R_1 is OR_2 or NHR_3,

R_2 is hydrogen; C_{1-10} alkyl; C_{1-10} alkyl substituted by halogen, C_{1-4} alkoxy, C_{6-10} aryl, C_{6-10} aryl substituted as

defined below for R_2 aryl, di-C_{1-4}-alkylamino or tri-C_{1-4}-alkylammonium; C_{4-10}-cycloalkyl; C_{4-10}-cycloalkyl substituted by C_{1-4}-alkyl; C_{6-10}-aryl; C_{6-10}-aryl substituted by 1–3 halogen atoms, a phenyl group, 1–3 alkyl groups of 1–4 carbon atoms each, or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy, or alkoxy group of 1–4 carbon atoms; or a 5- or 6-membered aromatic heterocycle containing one O, N or S atom, all other atoms being C—atoms;

R_3 is an acyl group of a C_{1-15} hydrocarbon carboxylic or sulfonic acid;

X is oxygen;

A is a $—CH_2—CH_2—$, trans-CH=CH—, or —C≡C-group;

W is a free or functionally modified hydroxymethylene group or a free or functionally modified

wherein the OH-group can be in the α- or β-position;

R_5 is a free or functionally modified hydroxy group;

wherein the term "functionally modified" refers to replacement of the H-atom on the hydroxy group with an acyl group of a C_{1-15} hydrocarbon carboxylic or sulfonic acid or tetrahydropyranyl, tetrahydrofuranyl, p-ethoxyethyl, trimethylsilyl, dimethyl-tert-butylsilyl, or tri-p-benzylsilyl;

D is C_{2-3} alkylene optionally substituted by fluorine, 1,2-methylene or 1,1-trimethylene;

E is $—CR_6—CR_7—$ in the 19-position, wherein R_6 and R_7 are hydrogen or alkyl of 1–5 carbon atoms;

R_4 is H; is a C_{1-10} aliphatic group; a C_{1-10} aliphatic group substituted by C_{6-10}-aryl or C_{6-10}-aryl in turn substituted as defined for R_2 above; C_{4-10}-cycloalkyl; C_{4-10}-cycloalkyl substituted by C_{1-4} alkyl; C_{6-10}-aryl; C_{6-10}-aryl substituted as defined for R_2 aryl above; or a 5- or 6-membered aromatic heterocycle containing one O, N or S-atom, all other atoms being C-atoms; or, when R_2 is hydrogen, a physiologically compatible salt thereof with a base.

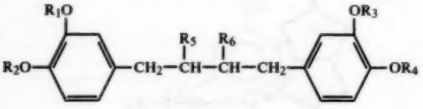
4,708,964

LIPOXYGENASE INHIBITORS

Larry M. Allen, Fort Collins, Colo., assignor to Chemex Pharmaceuticals, Denver, Colo.

Filed Feb. 9, 1984, Ser. No. 578,414
Int. Cl.[4] A61K *31/34, 31/065*
U.S. Cl. 514—533 **6 Claims**

1. The method for treating psoriatic lesions in a host in need of such treatment comprising topically applying to said lesions an effective amount of a pharmaceutical preparation comprising a suitable pharmaceutical carrier and a compound selected from the compound of the formulae:



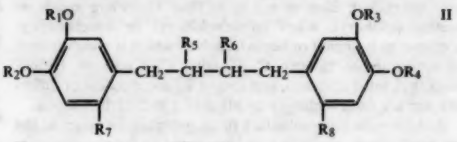
I

wherein

R_1 is $—OC)_n(CH_2)_mCOOR$ and where n is 0 or 1, m is 1–4, and R is H, $—CH_3$ or $—C_2H_5$; or an acid moiety, including an amino acid moiety;

R_2, R_3 and R_4 are, independently, H or R_1; and

R_5 and R_6 are, independently, H or $—CH_3$;



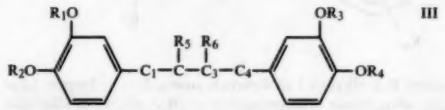
II

wherein

R_1, R_2, R_3 and R_4 are, independently, H or $—CH_3$; or R_1 and R_2 and/or R_3 and R_4 taken together are $—CH_2—$;

R_5 and R_6 are, independently, H or $—CH_3$; and

R_7 and R_8 are, independently, H, $—SO_3H$ or $—SO_3Na$; and



III

wherein

there are, independently, double or single bonds in the 1–2 and 3–4 positions; and

R_1, R_2, R_3 and R_4 are, independently, H, $—CH_3$, or R_1 and R_2 and/or R_3 and R_4 taken together are $—CH_2—$; and

R_5 and R_6 are, independently, a 2–12 dienoic fatty acid moiety, a 1–12 mono- or dialkene, —CHO, —COOH or taken together are succinic anhydride.

4,708,965

METHOD OF TREATING HERPES VIRUS INFECTIONS WITH N,N'-DIACETYLCYSTINE AND DERIVATIVES

Lee R. Morgan, 725 Topaz St., New Orleans, La. 70124

Filed Sep. 16, 1985, Ser. No. 776,580
Int. Cl.[4] A61K *31/195*
U.S. Cl. 514—563 **6 Claims**

1. A method of treating herpes lesions in humans, comprising the step of:

applying to the herpes lesions a therapeutically effective amount of a compound sufficient to reduce inflammation of the lesions, the compound being selected from the group consisting of N,N'-diacetylcystine, N-acetylhomocysteine and N-acetylcysteine.

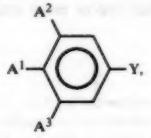
4,708,966

NOVEL ANTI-INFLAMMATORY AGENTS, PHARMACEUTICAL COMPOSITIONS AND METHODS FOR REDUCING INFLAMMATION

Maurice E. Loomans; Randall S. Matthews, both of Cincinnati, and Joseph A. Miller, Fairfield, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 27, 1986, Ser. No. 879,863
Int. Cl.[4] A61K *31/12*
U.S. Cl. 514—689 **24 Claims**

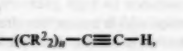
1. An anti-inflammatory compound having the structure:



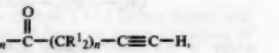
wherein:

(a) A^1 is selected from the group consisting of —OH, —H,

and $-O_2CR$; wherein R is a straight or branched chain alkyl group having from 1 to about 10 carbon atoms;
(b) A^2 and A^3 are independently selected from the group consisting of $-C(CH_3)_3$, $-Si(CH_3)_3$, and $-CF_3$; and
(c) Y is selected from the group consisting of:
(1) $-(CR^1_2)_n-C\equiv C-H$, wherein n is an integer from 1 to about 6;
(2)



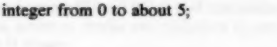
wherein n is an integer from 0 to about 5;
(3)



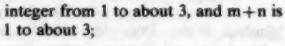
wherein m is an integer from 1 to about 5, and m+n is an integer from 1 to about 5;
(4)

wherein n is 0 or 1;
(5) $-(CR^1_2)_n-CR^3=CH_2$, wherein n is an integer from about 2 to about 6;
(6)

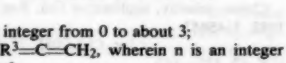
wherein n is an integer from 0 to about 5;
(7)



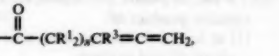
wherein m is an integer from 1 to about 3, and m+n is an integer from 1 to about 3;
(8)



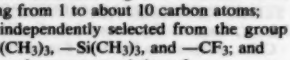
wherein n is an integer from 0 to about 3;
(9) $-(CR^1_2)_n-CR^3=C=CH_2$, wherein n is an integer from 0 to about 6;
(10)



wherein m+n is an integer from 0 to about 5;
(11)



wherein n is an integer from 0 to about 3;
(12) $-(CR^1_2)_n-CH(ZR^4)_2$, wherein n is an integer from 1 to about 6; and
(13)



wherein n is an integer from 1 to about 5, m is an integer from 0 to about 4, and m+n is an integer from about 1 to about 5;
and wherein each R^1 is independently selected from the group consisting of —H, $-OR^3$, $-NR^3_2$, $-NR^3_3+$, $-N(R^3)C(O)R^3$, $-O_2CR^3$, $-CO_2R^3$, $C(O)NR^3_2$, straight or branched chain saturated alkyl group having from 1 to about 3 carbon atoms, and straight or branched chain unsaturated alkyl group having from 1 to about 3 carbon atoms; each R^2 is independently selected from the group consisting of —H, $-OR^3$, $-NR^3_2$, $-NR^3_3+$, $-N(R^3)C(O)R^3$, $-O_2CR^3$, $-CO_2R^3$, $C(O)NR^3_2$, straight or branched chain saturated alkyl group having from 1 to about 3 carbon atoms, and straight or branched chain unsaturated alkyl group having from 1 to about 2 carbon atoms; each R^3 is independently selected from the group consisting of —H, methyl and ethyl; each R^4 is independently selected from the group consisting of $-CH_3$ and $-CH_2CH_3$, or the R^4's may be joined to form a cyclic acetal such that both R^4's together are one group selected from $-(CH_2)_2-$ and $-(CH_2)_3-$; and each Z is independently selected from the group consisting of O, S, NH, and NR^4; or the pharmaceutically-acceptable salt thereof.

20. A method for treating diseases characterized by inflammation, said method comprising administering to a human or lower animal in need of such treatment a safe and effective amount of an anti-inflammatory compound of claim **1**.

4,708,967

THERMOSETTING RESIN BINDER PARTICLES AND METHODS FOR MAKING WAFERBOARD

Rudolph Ferentchak, New Providence; James F. Kozischek, Belvidere, and Jerome E. Schwartz, Bloomfield, all of N.J., assignors to Reheis Chemical Company, Inc., Berkeley Heights, N.J.

Filed Mar. 25, 1986, Ser. No. 843,949
Int. Cl.[4] C08J *9/32*
U.S. Cl. 521—56 **23 Claims**

1. A spray dried powder of thermosetting resinous material in an intermediate polymeric stage, said powder comprising hollow, thick-walled, macrospherical particles consisting essentially of thermosetting resinous material, said particles having a bulk density greater than about 35 lbs/ft^3 and having diameters predominantly between about 10 and 74 microns.

4,708,968

DIVINYLBENZENE IN EXPANDABLE BEADS FOR CUP MOLDING

Alvin R. Ingram, West Chester, and Adolph V. Di Giulio, Wayne, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Continuation of Ser. No. 859,976, May 5, 1986, Pat. No. 4,692,472. This application Jun. 22, 1987, Ser. No. 64,354
Int. Cl.[4] C08J *9/18*
U.S. Cl. 521—60 **1 Claim**

1. Expandable copolymer beads for use in producing foamed cups with improved strength and thermal properties comprising (a) copolymer beads made by copolymerizing a vinyl aromatic monomer and divinylbenzene said copolymer beads having a gel content of 0–50% by weight and a toluene soluble portion having a weight average molecular weight between 280,000 and 750,000 a polydisperisty of 3.0 to 7.0, and a bead size of through 30 mesh and on 80 mesh, U.S. Standard Sieve and (b) 3–12% of a blowing agent selected from the group consisting of aliphatic hydrocarbons containing 4–6 carbon atoms, halogenated hydrocarbons which boil at a temperature below the softening point of the polymer, and mixtures of these.

4,708,969

CYCLOOLEFIN COMPOSITION AND METHOD FOR MAKING HIGH TG FIBER REINFORCED POLYMERIC PRODUCT

Douglas R. Leach, Newark, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 672,390, Nov. 16, 1984, Pat. No. 4,598,102, which is a continuation-in-part of Ser. No. 623,307, Jun. 21, 1984, Pat. No. 4,496,669, which is a continuation of Ser. No. 552,872, Nov. 17, 1983, Pat. No. 4,458,037. This application Jun. 13, 1986, Ser. No. 874,191

Int. Cl.[4] C08G *18/14*

U.S. Cl. 521—82 42 Claims

1. A low solvent feed composition for polymerization of cyclic olefin having less than one percent of noncycloolefin solvent on a molar basis, comprising:

(a) at least two cyclic olefins; and

(b) an activator mixture comprising a dialkylaluminum iodide.

4,708,970

SEMI-ORGANIC FOAMS

Thomas J. Miranda, Clay Township, St. Joseph County, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 31, 1986, Ser. No. 948,116

Int. Cl.[4] C08J *9/14*

U.S. Cl. 521—123 20 Claims

1. An in situ foamable semi-organic composition, comprising:

a half ester adduct prepared by reacting an anhydride and an unsaturated conjugated vinyl hydroxy compound;

a fluorocarbon blowing agent; and

an initiator.

4,708,971

BICYCLIC AMIDE ACETAL/POLYISOCYANATE POLYMERS

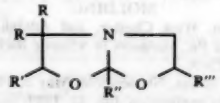
Anil B. Goel, Worthington, and Timothy A. Tufts, Columbus, both of Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.

Filed Apr. 11, 1986, Ser. No. 850,647

Int. Cl.[4] C08G *18/30*

U.S. Cl. 521—167 5 Claims

1. The process for preparing a polyurethane which comprises reacting a bicyclic amide acetal conforming to the formula



wherein R, R′, R″, and R‴ independently represent hydrogen, an alkyl group having from 1 to 20 carbon atoms, an aryl group having from 6 and 12 carbon atoms, an alkaryl group having from 7 to 20 carbon atoms, an alkyl ether group having from 1 to 20 carbon atoms or an aryl ether group having from 6 to 20 carbon atoms with a polysiocyanate in the presence of a plasticizer selected from the group consisting of carboxylic acid esters, organic phosphites, organic phosphates, alkylene carbonates, lactones, fatty oils, cyclic polyethers, aromatic compounds free from ester groups, partially hydrogenated aromatic compounds free from ester groups and halogenated aliphatic compounds boiling above 150° C., and a polyurethane catalyst at a temperature in the range of from about ambient temperature to about 200° C.

4,708,972

STEAM RESISTANT MODIFIED POLYIMIDE FOAMS

John V. Long, El Cajon, and John Gagliani, San Diego, both of Calif., assignors to Imi-Tech Corporation, Elk Grove Village, Ill.

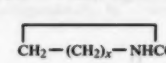
Filed Jun. 26, 1986, Ser. No. 879,033

Int. Cl.[4] C08J *9/22*

U.S. Cl. 521—185 19 Claims

1. The method of making a flexible modified polyimide resin foam having resistance to high pressure steam and good mechanical properties which comprises the step of:

mixing together an aromatic dianhydride, a reagent selected from an oxoimine having



where "x" is a positive integer from 2 to 4, an amino acid or a mixture thereof, and an esterifying alcohol; in which the material produced by a spray drying step of this method is soluble; heating the mixture to a temperature of about 60° to 120° C. for about 30 to 90 minutes to produce an ester;

adding thereto at least one diamine;

adding thereto a second alcohol in which the material produced by a spray drying step of this method is insoluble;

drying the resulting solution in a spray dryer;

heating the resulting dry material above its melting point whereby a foam having high flexibility and resiliency and resistance to high pressure steam is produced.

4,708,973

THERMOPLASTIC POLYAMIDE AS FRAGRANCE CARRIER

Manfred Dohr, Duesseldorf-Holthausen; Norbert Wiemers, Monheim, and Werner Gruber, Korschenbroich, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 678,329, Dec. 5, 1984, abandoned. This application May 30, 1986, Ser. No. 870,651

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1983, 3345847

Int. Cl.[4] C08L *77/06*

U.S. Cl. 523—102 17 Claims

1. A thermoplastic polyamide and fragrance or perfume composition consisting essentially of:

(A) a thermoplastic polyamide which is the condensation reaction product of:

(1) at least one dimeric fatty acid present in about 40 to about 48 mol percent;

(2) at least one monomeric fatty acid present in about 2 to about 10 mol percent;

(3) at least one polyether diamine having a molecular weight of about 500 to about 5,000 present in about 4 to about 25 mol percent; and

(4) at least one aliphatic diamine present in about 25 to about 46 mol percent; and

(B) a fragrance or perfume incorporated within said thermoplastic polyamide in a concentration of about 1 to about 30 percent by weight, based upon the weight of said polyamide.

4,708,974

ENHANCED HYDROCARBON RECOVERY BY PERMEABILITY MODIFICATION WITH PHENOLIC GELS

Ping W. Chang, Waterford; Gordon D. Gruetzmacher; Clifford N. Meltz, both of Gales Ferry, and Rocco A. Totino, Waterford, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed Oct. 1, 1984, Ser. No. 656,801

Int. Cl.[4] C08L 61/06; C09K 17/00; E02C 3/12

U.S. Cl. 523—130 9 Claims

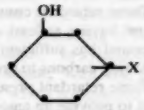
1. A gel-forming composition useful for the selective permeability modification of the strata of a subterranean hydrocarbon-containing reservoir comprising

(A) an aqueous medium selected from the group consisting of fresh water and reservoir brines having a total dissolved solids content ranging from about 0.05 to about 20 percent;

(B) a monoaldehyde of from 1 to 2 carbon atoms; and

(C) a compound selected from the group consisting of

(1) a compound of the formula



where X is meta OH, meta—OCH_2CH_2OH and ortho or para-$CH2SO_3Na$ or a mixture of said —CH_2SO_3Na and H; and

(2) the sodium salt of 4-phenolsulfonic acid; the weight ratio of components (B) to (C) being from 1:2 to 2:1 and the concentration of each in the total composition ranging from about 0.25 to about 5 weight percent with components (B) and (C) being combined at a pH of between 5 and 10.0 and at a temperature of from about 25° C. to about 120° C., wherein gellation is achieved by reacting only components (B) and (C) at said concentration range in the aqueous media and gellation is controlled by said pH range.

4,708,975

LOW SMOKE GENERATING, HIGH CHAR FORMING, FLAME RETARDANT THERMOPLASTIC MULTI-BLOCK COPOLYESTERS

Albert L. Shain, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 2, 1986, Ser. No. 847,190

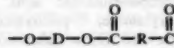
The portion of the term of this patent subsequent to Apr. 15, 2003, has been disclaimed.

Int. Cl.[4] C08K 3/34, 3/26, 3/22

U.S. Cl. 523—216 15 Claims

1. A substantially nondripping, low smoke generating, high char forming, flame retardant thermoplastic copolyester composition which comprises

(a) a multi-block copolyester of film forming molecular weight consisting essentially of (A) repeating high melting point blocks comprising repeating short chain ester units having the formula

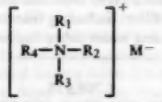


wherein D is a divalent radical remaining after the removal of hydroxyl groups from a low molecular weight diol having a molecular weight not greater than 250 and R is a divalent radical remaining after the removal of carboxyl groups from a dicarboxylic acid having a molecular weight not greater than 300, D and R being selected so that a polymer consisting essentially of short chain ester units having a number average molecular weight of at least 5000 has a melting point of at least 150° C., (B) repeating low melting point blocks which are derived from compounds containing hydroxyl groups or carboxyl groups or mixtures thereof and having a number average molecular weight of 400–4000 and a melting point not greater than about 100° C., and (C) an amount of difunctional radicals sufficient to join repeating blocks (A) and (B) to form a multi-block copolyester, the weight ratio of (A) to (B) being from about 1:0.12 to 1:4,

(b) about 5–35 parts per 100 parts of said multi-block copolyester of a bromine- or chlorine-containing flame retardant containing at least 50% by weight bromine or chlorine,

(c) about 0.20–1.5 parts per part of said bromine- or chlorine-containing flame retardant of antimony trioxide, and

(d) a drip suppressant selected from (1) at least about 1 part per 100 parts of said multi-block copolyester of an organophilic clay which is the reaction product of at least one quaternary ammonium salt with a smectite clay having an ion exchange capacity of at least 75 meq/100 g of clay, said quaternary ammonium salt having the formula



wherein M^- is selected from the group consisting of chloride, bromide, iodide, nitrite, hydroxide, acetate, methyl sulfate and mixtures thereof, wherein R_1 is an alkyl group having 12–22 carbon atoms and wherein R_2, R_3 and R_4 are selected from the group consisting of hydrogen, alkyl groups containing 1–22 carbon atoms, aryl groups and aralkyl groups containing 1–22 carbon atoms in the alkyl chain, (2) at least about 2 parts per 100 parts of said multi-block copolyester of fumed colloidal silica, or (3) at least about 0.2 parts per 100 parts of said multi-block copolyester of polytetrafluoroethylene,

(e) about 5–100 parts per 100 parts of said multi-block copolyester of alumina trihydrate, and

(f) up to about 100 parts per 100 parts multi-block copolyester of calcium carbonate,

with the proviso that the total amount of (e) and (f) is less than about 140 parts per 100 parts multi-block copolyester.

4,708,976

POLYMER COMPOSITIONS CONTAINING MAGNETICALLY SUSCEPTIBLE FILLER

Timothy G. Ryan, Chester, England, assignor to Imperial Chemical Industries Plc, London, England

Continuation of Ser. No. 665,346, Oct. 26, 1984, abandoned. This application Apr. 23, 1986, Ser. No. 854,705

Claims priority, application United Kingdom, Nov. 10, 1983, 8329957

Int. Cl.[4] C08K 3/22

U.S. Cl. 523—300 6 Claims

1. A method of influencing the orientation of the polymer molecules in a thermotropic melt comprising forming a molten mixture of a polymer capable of forming a thermotropic melt which exhibits anisotropic (liquid crystalline) properties and 0.05% to 5.0% by weight of the mixture of a finely divided magnetically susceptible filler and passing the mixture through a magnetic field prior to or during the formation of a shaped article from the melt.

4,708,977

FIRE RETARDANT PLASTICS MATERIAL

Alexander Miutel, and Jerry P. Shira, both of Toronto, Canada, assignors to Phoenix Foam Inc., Toronto, Canada

Continuation of Ser. No. 588,424, Feb. 21, 1984, abandoned. This application Mar. 6, 1987, Ser. No. 23,929

Int. Cl.[4] C08K 5/00

U.S. Cl. 523—402 15 Claims

1. A plastics material with a resin binder, that includes copolymerizable monomer and an epoxy based vinyl ester in its composition, having:

a combination of fillers said combination of fillers including fusible fillers that begin melting at relatively low temperatures and retain a spread liquidous form over a large temperature range; said combination of fillers also including high temperature fillers that resist melting at temperatures substantially higher than the melting point of the fusible fillers; said fusible fillers being added in sufficient proportion to the said high temperature fillers such that, in response to the heat of fire, the spread liquid from the fusible fillers in combination with the high temperature fillers forms an insulative layer over the said resin binder; said combination of fillers including fillers capable of releasing chemically-bonded water when heated.

4,708,978

ANTI-SKID COATING COMPOSITION

Jack L. Rodgers, R.D. #2, Box 573, Seneca, Pa. 16346

Continuation-in-part of Ser. No. 745,786, Jun. 17, 1985, Pat. No. 4,614,755. This application Jun. 16, 1986, Ser. No. 874,422

The portion of the term of this patent subsequent to Sep. 30, 2003, has been disclaimed.

Int. Cl.[4] C08K 3/10; C08J 3/20

U.S. Cl. 524—5 23 Claims

1. A non-skid surface composition suitable for application to decks, floor and walkways to provide such surfaces with increased resistance to skidding, the composition comprising a blend of hydraulic cement in the range of 5 to 18 wt. %, polyvinyl acetate in the range of 0.5 to 6.0 wt. %, the balance silica sand and admixed therewith a solution comprised of 10 to 70 wt. % of a vinyl acetate-ethylene copolymer, the remainder water, the concentration of the blend in the solution being in the range of 5 to 25 lbs/gallon of solutions.

4,708,979

PROCESS FOR THE STABILIZATION OF SPHERICALLY POLYMERIZED POLYOLEFINS

Enea Pedrazzetti, Reinach, Switzerland; André Schmitter, Hegenheim, France, and Walter W. Meyer, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

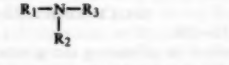
Filed Apr. 25, 1986, Ser. No. 856,083

Claims priority, application Switzerland, May 2, 1985, 1869/85

Int. Cl.[4] C08K 5/17, 5/32, 5/34

U.S. Cl. 524—249 10 Claims

1. A process for the stabilisation of a spherically polymerised polyolefin which comprises treating said polyolefin with at least one emulsion or dispersion containing a stabiliser or a mixture of stabilisers and 0.05 to 1.0% by weight, based on the polyolefin, of an amine of formula I



(I)

wherein R_1 is C_1–C_{20}alkyl or C_1–C_{20}alkyl which is substituted by —OH, or is C_3–C_{50}alkyl which is interrupted by one or more oxygen atoms, or is C_1–C_8alkoxy, and each of R_2 and R_3 independently of the other is hydrogen or has one of the meanings indicated for R_1, or R_2 and R_3, together with the nitrogen atom to which they are attached, form a 5- to 7-membered heterocyclic ring.

4,708,980

FLAME RETARDANT POLYETHYLENE TEREPHTHALATE

William E. Garrison, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 935,384, Nov. 26, 1986. This application Dec. 15, 1986, Ser. No. 941,791

Int. Cl.[4] C08K 5/03, 3/22

U.S. Cl. 524—412 7 Claims

1. A polyethylene terephthalate molding blend comprising

(a) 20–90% by weight of blend of polyethylene terephthalate having an inherent viscosity of at least 0.4,

(b) 0.1–20% by weight of blend of (a) and (b) of at least one sodium and/or potassium salt of a carboxyl containing organic composition selected from the class consisting of hydrocarbon monocarboxylic acids containing 7–25 carbon atoms, hydrocarbon di- or tricarboxylic acids of 7–54 carbon atoms, and an ionic hydrocarbon copolymer derived from an alpha-olefin of 2–5 carbon atoms and an alpha, beta ethylenically unsaturated carboxylic acid of 3–5 carbon atoms.

(c) a halogenated flame retardant consisting of an aromatic organic compound having at least one aromatic ring in which the compound has sufficient halogen bonded directly to aromatic ring carbons to provide flame retardant properties, said flame retardant present in said blend in an amount sufficient to provide an amount of halogen to the blend of between about 5 and 30% by weight based on weight of blend with (a),

(d) 0.3–8% by weight of blend with (a) of antimony oxide, said antimony oxide being added to the blend in the form of a concentrate in polyamide wherein the antimony oxide is present in an amount of about 20–80 by weight of the concentrate.

4,708,981

WATER INSOLUBLE PROTON CONDUCTING POLYMERS

Joseph J. Zupancic, Bensenville; Raymond J. Swedo, Mt. Prospect, and Sandra Petty-Weeks, Naperville, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Dec. 11, 1985, Ser. No. 807,727

Int. Cl.[4] C08L 29/04, 33/02, 41/00, 43/02

U.S. Cl. 525—59 27 Claims

1. A water-insoluble proton-conducting membrane which consists of an interpenetrating network membrane which comprises a host polymer blend and a guest polymer, wherein the host polymer blend is comprised of (1) an acid selected from the group consisting of phosphoric acids and sulfuric acid and (2) a component selected from the group consisting of (i) a polymer selected from the group consisting of poly(vinyl alcohol) poly(ethyleneimine), poly(acrylic acid), poly(ethylene oxide), poly(2-ethyl-2-oxazoline), phenol formaldehyde resins, poly(acrylamide), poly(N-substituted acrylamide), poly(4-vinylpyridine), poly(methacrylic acid), poly(N-vinylimidazole), poly(vinyl sulfonic acid), and poly(2-vinylpyridine) and (ii) copolymers having monomer units of (i); and wherein the guest polymer is formed from (1) a monofunctional monomer selected from the group consisting of acrylic acid, methacrylic acid, acrylamide, methacrylamide, 2-acrylamido-2-methylpropanesulfonic acid, N-benzylacrylamide, N-ethylmethacrylamide, N-phenylacrylamide and N-phenylmethacrylamide and (2) a difunctional cross-linking agent selected from the group consisting of methylenebisacrylamide, N,N-diallylacrylamide, m-xylenebisacrylamide and N,N'-trimethylenebisacrylamide, with the proviso that the monofunctional monomer which is employed to form the guest polymer differs from any of the monomeric repeat units which comprise the organic polymer in the host polymer blend, the mol ratio of host polymer to guest polymer ranging from about 5:1 to about 1:20, the mol ratio of repeat units of said polymer or copolymer to said acid in said host polymer ranging from about 1:1 to about 5:1 and the mol ratio of monofunctional

monomer to difunctional cross-linking agent in said guest polymer ranging from about 35:1 to about 1:10.

17. A process for the preparation of a water-insoluble proton-conducting interpenetrating polymer network membrane which consists of admixing at admixing conditions a solution of a host polymer blend comprised of (1) an acid selected from the group consisting of phosphoric acids and sulfurinc acid and (2) a component selected from the group consisting of (i) a polymer selected from the group consisting of poly(vinyl alcohol) poly(ethyleneimine), poly(acrylic acid), poly(ethylene oxide), poly(2-ethyl-2-oxazoline), phenol formaldehyde resins, poly(acrylamide), poly(N-substituted acrylamide), poly(4-vinylpyridine), poly(methacrylic acid), poly(N-vinylimidazole), poly(vinyl sulfonic acid), and poly(2-vinylpyridine) and (ii) copolymers having monomer units of (i) with a solution of a guest polymer formed from (1) a monofucntional monomer selected from the group consisting of acrylic acid, methacrylic acid, acrylamide, methacrylamide, 2-acrylamido-2-methylpropanesulfonic acid, N-benzylacrylamide, N-ethylmethacrylamide, N-phenylacrylamide and N-phenyl-methacrylamide and (2) a difunctional cross-linking agent selected from the group consisting of methylenebisacrylamide, N,N-diallylacrylamide, m-xylenebisacrylamide and N,N′-trimethylenebisacrylamide, with the proviso that the monofunctional monomer which is employed to form the guest polymer differs from any of the monomeric repeat units which comprises the organic polymer in the host polymer blend, casting the admixture on a casting surface, removing the solvent, curing the resultant membrane, and recovering the resultant water-insoluble proton-conducting interpenetrating polymer network membrane, the mol ratio of host polymer to guest polymer ranging from about 5:1 to about 1:20, the mol ratio of repeat units of said polymer or copolymer to said acid in said host polymer ranging from about 1:1 to about 5:1 and the mol ratio of monofunctional monomer to difunctional cross-linking agent in said guest polymer ranging from about 35:1 to about 1:10.

4,708,982

CURED UNSATURATED POLYESTER RESIN OR VINYL ESTER RESIN CONTAINING FLUORINE-CONTAINING GROUPS ORIENTED ON ITS SURFACE

Shigeki Banno; Yoshihiro Oshibe, and Yoshimasa Nakagawa, all of Aichi, Japan, assignors to Nippon Oil and Fats Co., Ltd., Japan

Filed Oct. 1, 1985, Ser. No. 782,397

Claims priority, application Japan, Oct. 29, 1984, 59-225662

Int. Cl.[4] C08L *67/06, 63/10*

U.S. Cl. 525—92 **3 Claims**

1. A cured unsaturated polyester resin or vinyl ester resin containing fluorine-containing groups oriented on its surface, comprising an unsaturated polyester resin or vinyl ester resin and a block copolymer, said block copolymer consisting essentially of a polymer portion of at least one fluorine-containing vinyl monomer and a polymer portion compatible with the unsaturated polyester resin or vinyl ester resin of at least one vinyl monomer selected from the group consisting of methacrylic acid ester, acrylic acid ester, fatty acid vinyl ester, aromatic vinyl monomer, amide group-containing vinyl monomer, hydroxyl group-containing vinyl monomer, carboxylic acid group-containing vinyl monomer, methacrylonitrile, acrylonitrile, fumaric acid diester, maleic anhydride, methallyl glycidyl ether and allyl glycidyl ether, said block copolymer being present in amounts of at least 0.05% by weight based on the amount of resin, and wherein the cured unsaturated polyester resin or vinyl ester resin is obtained by curing said unsaturated polyester resin or vinyl ester resin with said block copolymer.

4,708,983

ARYLENE SULFIDE POLYMERS OF IMPROVED IMPACT STRENGTH

Yeon F. Liang, Florence, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 744,078, Jun. 12, 1985, abandoned. This application Jun. 18, 1986, Ser. No. 875,815

Int. Cl.[4] C08F *8/00*

U.S. Cl. 525—101 **41 Claims**

1. A composition comprising:

(a) at least one poly(arylene sulfide),

(b) at least one polysiloxane having the repeating unit

(c) at least one trialkoxysilane having the formula $X—Si(OR')_3$, and

(d) at least one solid, resinous polyolefin; wherein each R is a monovalent hydrocarbyl radical having from 1 to 8 carbon atoms, individually selected from the group consisting of alkyl, cycloalkyl, alkylcycloalkyl, aryl and alkaryl; each R′ is a radical having from 1 to 8 carbon atoms, individually selected from the group consisting of alkyl, alkoxyalkyl and alkylcarbonyl radicals; and X is a radical having from 1 to 8 carbon atoms selected from the group consisting of alkyl, alkenyl, epoxyalkyl, mercaptoalkyl, aminoalkyl, N-(aminoalkyl)aminoalkyl, ureidoalkyl, haloalkyl, alkenoyloxyalkyl, and epoxyalkoxyalkyl groups.

4,708,984

BETA-HYDROXYALKYLCARBAMYL-METHYLATED AMINOTRIZINES AND CURABLE COMPOSITIONS CONTAINING THE SAME

Peter S. Forgione, and Balwant Singh, both of Stamford, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 16, 1986, Ser. No. 864,626

Int. Cl.[4] C08F *8/30;* **C08L** *75/00*

U.S. Cl. 525—127 **10 Claims**

1. A curable composition comprising:

(a) a triazine compound selected from

(i) a triaminotriazine compound of the formula $C_3N_6(CH_2OR)_{6-x}(CH_2NHCOOR^1)_x$;

(ii) a benzoguanamine compound of the formula $C_3N_5(C_6H_5)(CH_2OR)_{4-y}(CH_2NHCOOR^1)_y$;

(iii) an oligomer of (i) or of (ii); or

(iv) a mixture of at least two of any of (i), (ii) and (iii), wherein the R groups are, independently, hydrogen or alkyl from 1 to 12 carbon atoms, the R^1 groups are, independently, beta-hydroxyalkyl,of from 2 to 18 carbon atoms, alone, or combined with alkyl of from 1 to 18 carbon atoms, x is in the range of from about 2 to about 6, and y is in the range of from about 2 to about 4;

(b) an amino resin or an active hydrogen-containing material; and,

(c) a cure catalyst.

4,708,985

HYDROPHILIC POLYESTER COMPOUNDS

Michael Diamantoglou, Erlenbach; Helmut Mägerlein, Obernburg; Walter Brodowski, Amorbach; Wolfgang Grimm, Elsenfeld, and Gerhard Meyer, Obernburg, all of Fed. Rep. of Germany, assignors to Akzona Incorporated, New York, N.Y.

Filed Mar. 22, 1982, Ser. No. 360,146

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1981, 3110906

Int. Cl.[4] C08L *67/02*

U.S. Cl. 525—166 **6 Claims**

1. A process for the production of a molding compound

selected from the group consisting of a homopolyester and copolyester of terephthalic and isophthalic acid with one or more polyvalent alcohols selected from the group consisting of ethylene glycol, diethylene glycol, 1,2-propanediol, 1,3-propanediol and 1,4-butanediol, said molding compound comprising a mixed alkali-alkaline earth salt of calcium or magnesium, and 20 to 70 equivalent % lithium, potassium, or sodium, of salt-forming polymers selected from the group consisting of polymers formed from one or more monomers selected from the group consisting of vinyl sulfonic acid, acrylamidoalkylene sulfonic acid, sulfonated styrene, acrylic acid, methacrylic acid, maleic acid, fumaric acid, itaconic acid, crotonic acid, vinyl phosphonic acid, monoalkylester of maleic acid, and monoalkylester of fumaric acid, copolymers thereof with comonomers selected from the group comprising esters of said monomers, styrene, alpha-olefins and vinyl alkyl ethers, and mixture of said polymers and copolymers as filler, in a finely dispersed distribution, said process comprising the step of adding said filler polymer, as a suspension in a polyvalent alcohol, to the polycondensation system for said polyester before or during polycondensation.

4,708,986

PROCESS FOR PRODUCING THERMOPLASTIC MOLDING COMPOSITIONS FROM POLYCONDENSATION RESINS AND AQUEOUS LATEXES

Christian Gerth, Haltern, and Michael Dröscher, Dorsten, both of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Sep. 13, 1985, Ser. No. 776,075

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1984, 3433976; Jul. 16, 1985, 3525319

Int. Cl.[4] C08G *63/18*

U.S. Cl. 525—177 **14 Claims**

1. A process for the production of a molding composition, comprising contacting an aqueous latex and a thermoplastic polycondensation polymer susceptible to degradation in the presence of water, wherein said thermoplastic condensation polymer comprises a polyester and said contacting is effected at sufficiently high temperatures and under sufficiently strong shear forces, for a time sufficiently brief to prevent serious degradation of the polycondensation polymer and sufficiently long to provide a substantially homogeneous molding composition.

4,708,987

RAPID BULK POLYMERIZATION OF POLYBUTADIENE/NYLON AND RELATED BLOCK COPOLYMERS

William L. Hergenrother, Akron, and Arthur W. Greenstreet, Clinton, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 595,003, Mar. 29, 1984, abandoned. This application Feb. 28, 1986, Ser. No. 834,603

Int. Cl.[4] C08F *8/30;* **C08L** *47/00*

U.S. Cl. 525—184 **21 Claims**

1. A process for the rapid bulk polymerization of polybutadiene/nylon-6 block copolymers comprising the steps of:

preparing a mixture comprising from about 100 to about 50 parts by weight of a polybutadiene having a weight average molecular weight of about 3000 and terminated by a compound selected from the group consisting of isocyanates and isothiocyanates and end-capped with caprolactam to provide a stable imide type terminated polymer, with more than 0 to about 50 parts by weight of a branched high vinyl, 1,2-polybutadiene having a weight average molecular weight greater than 100,000 and neutralized with caprolactam;

charging said polymer mixture, without hydrolyzing said end-capped polybutadiene, to a reaction vessel with caprolactam; and

polymerizing said caprolactam at a temperature of at least about 120° C. said temperature being sufficient to flash off any solvents introduced during said step of preparing and for a time of up to about 30 minutes whereby polymerization proceeds in the absence of solvents to form a block copolymer with said end-capped polybutadiene.

4,708,988

PROCESS FOR DYNAMICALLY PARTIALLY GELLING FLUOROELASTOMERS

David L. Tabb, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 1, 1985, Ser. No. 750,181

Int. Cl.[4] C08F *8/06, 114/22*

U.S. Cl. 525—194 **6 Claims**

1. A process for the manufacture of a processable gelled fluoroelastomer which comprises simultaneously mixing, shearing and gelling, in an internal mixer, a fluoroelastomer comprising interpolymerized units of vinylidene fluoride and units of at least one other fluorine-containing monomer copolymerizable with vinylidene fluoride, said monomer containing from 2–7 carbon atoms, containing no bromine atoms and containing at least as many fluorine atoms as carbon atoms, in the presence of an organic peroxide gelling agent for the fluoroelastomer for a time and at a temperature sufficient to decompose the peroxide gelling agent, said peroxide gelling agent added to the fluoroelastomer in an amount to gel the fluoroelastomer to a gel content of from about 15–80% by weight, measured in methyl ethyl ketone at 80° C., and recovering the gelled fluoroelastomer.

4,708,989

POLYMER BASED DIELECTRIC MATERIAL WITH HIGH DIELECTRIC PERMITTIVITY

Dominique Broussoux, Marcoussis, and Francois Micheron, Gif sur Yvette, both of France, assignors to Thomson-CSF, Paris, France

Filed Jun. 18, 1986, Ser. No. 875,729

Claims priority, application France, Jun. 21, 1985, 85 09500

Int. Cl.[4] C08L *27/16*

U.S. Cl. 525—199 **11 Claims**

1. A polymer based dielectric material having a high dielectric constant, comprising:

an alloy of at least two ferroelectric polymers each having a different Curie temperature, said alloy being composed of the following combinations of polymers:

1. a homopolymer of vinylidene fluoride and at least one copolymer of vinylidene fluoride and trifluoroethylene;
2. at least two copolymers of vinylidene fluoride and trifluoroethylene;
3. at least two terpolymers, each comprising vinylidene fluoride and trifluoroethylene monomers and another fluorinated unsaturated monomer; or
4. a copolymer of (2) above and a terpolymer of (3) above.

4,708,990

ANIONIC POLYMERIZATION PROCESS

Pui K. Wong, Katy, and Dale L. Handlin, Jr., Houston, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Jun. 18, 1986, Ser. No. 875,823

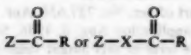
Int. Cl.[4] C08F *36/00, 136/00*

U.S. Cl. 525—250 **16 Claims**

1. A process for preparing a polymer which may be coupled at temperatures above about 200 C., said process comprising:

(a) solution polymerizing one or more monomers selected from the group consisting of conjugated dienes and monoalkenyl arenes under polymerization conditions at a temperature between about −75 C. and +150 C. with an organomonolithium compound, therein forming a living polymer P-Li; and

(b) contacting the solution containing said living polymer P-Li with an effective amount of arylcyclobutene monomer end-capping agent having the formula



where X is an alkylene or arylene group, Z is an arylcyclobutene group, R is selected from the group consisting of aryl groups, alkyl groups,

and H, and R^1 is an aryl group or alkyl group, therein forming an arylcyclobutene end-capped polymer.

4,708,991

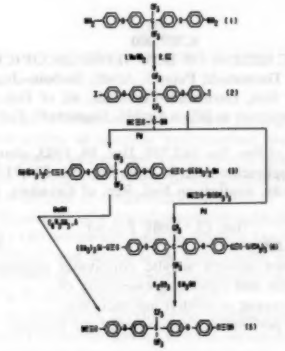
POLYMERS OF ETHYNYLTHIOPHENOXY DERIVATIVES OF DIPHENYLHEXAFLUOROPROPANE

Kreisler S. Y. Lau, Alhambra, and William J. Kelleghan, Whittier, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

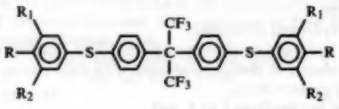
Division of Ser. No. 647,000, Sep. 4, 1984, which is a division of Ser. No. 453,431, Dec. 27, 1982. This application Sep. 24, 1985, Ser. No. 779,547

Int. Cl.[4] C08F *38/00*

U.S. Cl. 525—275 **5 Claims**



1. A polymer material consisting essentially of a homopolymer of a diphenylhexafluoropropane compound having the formula:



where one of R, R_1, an R_2 is ethynyl and the remainder of said R, R_1, and R_2 are hydrogen.

4,708,992

RUBBER COMPOSITIONS

Yoshio Tanimoto, and Kohichi Iketani, both of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 5, 1985, Ser. No. 804,844

Claims priority, application Japan, Dec. 14, 1984, 59-265133; Dec. 24, 1984, 59-278579

Int. Cl.[4] C08L *23/16, 9/00*

U.S. Cl. 525—313 **6 Claims**

1. A rubber composition which comprises 100 parts by weight of an ethylene α-olefin copolymer rubber 10 to 50 parts by weight of a polybutadiene rubber having at least 50% of 1,2 vinyl bond which is liquid at room temperature and/or polyisoprene rubber which is liquid at room tempreature and 4 to 25 parts by weight of sulfur.

4,708,993

COLD FLOW IMPROVER AND METHOD OF USE THEREOF

Michael I. Naiman, St. Louis; John A. Schield, Chesterfield, and Lawrence J. Cunningham, Kirkwood, all of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Aug. 6, 1986, Ser. No. 893,850

Int. Cl.[4] C08F *8/22*

U.S. Cl. 525—356 **15 Claims**

1. Composition comprising an oligomer of a polymerizable ester-containing halopolyalkylene, said oligomer being characterized by olefinic unsaturation in its backbone.

9. Process for preparing a composition of claim 1 which comprises subjecting a polymerizable ester-containing halopolyalkylene to bulk or solution oligomerization conditions of free radical catalysis at a temperature of from about 50° C. to about 140° C. at ambient pressure.

4,708,994

ENGINEERING THERMOPLASTICS CONTAINING PENDANT BENZOCYCLOBUTENE GROUPS

Pui K. Wong, Katy, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 30, 1986, Ser. No. 880,260

Int. Cl.[4] C08F *283/08*

U.S. Cl. 525—392 **19 Claims**

1. A polymeric composition which comprises a polyaryl having one or more arylcyclobutene groups pendant to an aromatic ring of said polyaryl, the polyaryl being selected from the group consisting of poly(aryl ether ketones), poly(aryl ether sulfones), poly(aryl ethers), poly(phenylene oxides), polyarylenes, polyphenylenes, polyxylylenes, polyarylacetylenes, poly(aryl sulfides), poly(aryl esters), poly(aryl carbonates) and poly(aryl amides), poly(aryl ester carbonates, poly(aryl amide imides), poly(aryl ether imides), and poly(aryl ether sulfone imides).

4,708,995

CHIP RESISTANT PRIMER COMPOSITION I

Panagiotis I. Kordomenos, Mt. Clemens; Andrew H. Dervan, Grosse Pointe Farms, and Dennis J. Grebur, Mt. Clemens, all of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 14, 1985, Ser. No. 798,044

Int. Cl.[4] C08G *63/06, 63/08*

U.S. Cl. 525—450 **8 Claims**

1. A hydroxy functional epoxy-polyester graft copolymer suitable for use in a thermosetting composition, which copolymer has a number average molecular weight ($\overline{M}_n$) of between about 2,000 and about 20,000, said copolymer being the product of polymerization of lactone monomers in the presence of hydroxy functional epoxy ester resin precursor having a number average molecular weight ($\overline{M}_n$) between about 1,000 and about 4,000, said precursor being the reaction product of (1) a chain extended product of diepoxide with diphenol and (2)

acid component in chain termination reaction, with acid component comprising primary hydroxy functional acid and reacted in about a 1 to 1 equivalent ratio to the chain extended product, wherein said polymerization of said lactone monomers is carried out at a temperature between about 50° C. and about 300° C. and the polymerization reaction mixture comprises between about 10 and about 80 weight percent said hydroxy functional epoxy ester resin precursor and between about 90 and about 20 weight percent said lactone monomers.

4,708,996

STABLE DISPERSIONS OF POLYMERS IN POLYEPOXIDES

Dwight K. Hoffman, and Charles B. Arends, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 517,130, Jul. 25, 1983, abandoned. This application Oct. 25, 1984, Ser. No. 664,672

Int. Cl.[4] C08F *283/10*; **C08L** *63/10*

U.S. Cl. 525—530 **29 Claims**

1. A dispersion which comprises an uncured polyepoxide as a continuous phase having dispersed therein (i) an insoluble polymer and (ii) a dispersion stabilizer which has a moiety compatible with the polyepoxide and a moiety compatible with the insoluble polymer, said insoluble polymer having been polymerized in situ in the uncured polyepoxide and in the presence of the dispersion stabilizer, the dispersion further characterized in that it remains stable at a temperature above 60° C.

4,708,997

SUSPENDING AGENT FOR THE SUSPENSION POLYMERIZATION OF WATER-SOLUBLE MONOMERS

Frederick W. Stanley, Jr.; Jack C. Lamphere, and Yohannes Chonde, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 757,237, Jul. 22, 1985. This application Mar. 14, 1986, Ser. No. 839,652

Int. Cl.[4] C08F *2/32*

U.S. Cl. 526—207 **7 Claims**

1. A process for the suspension polymerization of water-soluble monomers comprising:

(1) providing an aqueous phase comprising water and at least one water-soluble monomer,

(2) providing an oil phase comprising an inert hydrophobic liquid and a suspending agent comprising (a) hydrophobic fumed silicon dioxide, and (b) a copolymer of acrylic acid and lauryl methacrylate, and

(3) contacting the aqueous phase and the oil phase under conditions such that a water-in-oil suspension of polymer comprising polymerized water-soluble monomer is provided.

4,708,998

CYCLOPOLYMERIZABLE SULFOBETAINE MONOMER

Donald N. Schulz, Annandale, and Jeffrey J. Kaladas, S. Bound Brook, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Division of Ser. No. 688,243, Jan. 2, 1985, Pat. No. 4,585,846. This application Jan. 27, 1986, Ser. No. 822,841

Int. Cl.[4] C08F *12/30*

U.S. Cl. 526—287 **1 Claim**

1. A copolymer of N-(4-sulfobutyl)N-methyl dialkyl ammonium betaine and acrylamide, wherein the mole percent of the betaine unit is about 1 to 99 mole percent.

4,708,999

COPOLYMERS OF VINYL ACETATE AND POLY(ALKYLENEOXY) ACRYLATES

Finn L. Marten, Macungie, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

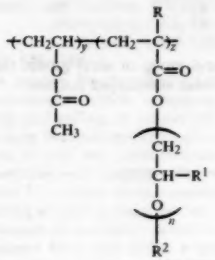
Continuation-in-part of Ser. No. 727,638, Apr. 26, 1985, Pat. No. 4,618,648. This application Aug. 8, 1986, Ser. No. 894,419

The portion of the term of this patent subsequent to Oct. 21, 2003, has been disclaimed.

Int. Cl.[4] C08F *18/00*

U.S. Cl. 526—320 **19 Claims**

1. A substantially homogeneous, random vinyl acetate copolymer comprising the following general structure:



wherein

R is hydrogen or methyl;

R^1 is hydrogen or methyl;

R^2 is hydrogen, C_1–C_{20} alkyl, C_6–C_{20} aryl or C_7–C_{30} alkylaryl;

n is a number from 1–1,000; provided n is not 1 when R^2 is hydrogen, methyl or ethyl;

y is 50–99.999 mole %; and

z is 0.001–50 mole %.

4,709,000

ACRYLIC RESINS OF LOW HYGROSCOPICITY

Franz Wenzel, Darmstadt; Peter J. Arndt, Seeheim-Jugenheim, and Werner Siol, Darmstadt-Eberstadt, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 562,710, Dec. 19, 1983, abandoned. This application Aug. 8, 1986, Ser. No. 894,714

Claims priority, application Fed. Rep. of Germany, Dec. 30, 1982, 3248602

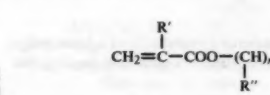
Int. Cl.[4] C08F *270/68*

U.S. Cl. 526—320 **9 Claims**

1. An at least ternary acrylic copolymer exhibiting low water absorption and consisting essentially of

(A) 20 to 85 percent of methyl methacrylate;

(B) at least 10 percent of a monomer of the formula



wherein

R′ is hydrogen or methyl,

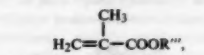
R″ is hydrogen or alkyl having from 1 to 7 carbon atoms,

Ar is phenyl or phenyl substituted with alkyl having from 1 to 7 carbon atoms,

n is an integer from 1 to 6, and

m is 0 or 1, but n and m are not both 1;

(C) at least 10 percent of a monomer of the formula



wherein

R''' is linear or branched hydrocarbon having from 2 to 20 carbon atoms, or alicyclic hydrocarbon having up to 12 carbon atoms and at least 5 ring carbon atoms;

(D) 0 to 40 percent of styrene or alpha-methyl styrene;

(E) 0 to 9.9 percent of 4-methylstyrene;

(F) 0 to 10 percent of a copolymerizable monomer, different from (A)–(E) whose solubility in water is less than 50 g per liter at 25° C. and which is an alpha-olefin, a halogenated olefin, an ester of an unsaturated dicarboxylic acid, or a vinyl ester of a C_3–C_8 carboxylic acid; and

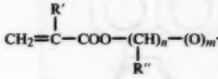
(G) 0 to 10 percent of acrylonitrile, methacrylonitrile, or a crosslinking monomer having in its molecule more than one group capable of free radical polymerization,

all said percentages being by weight of said copolymer.

4. An at least ternary acrylic copolymer exhibiting low water absorption and consisting essentially of

(A) 20 to 85 percent of methyl methacrylate;

(B) 0 to 50 percent of a monomer of the formula



wherein

R' is hydrogen or methyl,

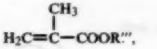
R'' is hydrogen or alkyl having from 1 to 7 carbon atoms,

Ar is phenyl or phenyl substituted with alkyl having from 1 to 7 carbon atoms,

n is an integer from 1 to 6, and

m is 0 or 1, but n and m are not both 1;

(C) at least 10 percent of a monomer of the formula



wherein

R''' is linear or branched hydrocarbon having from 2 to 20 carbon atoms, or alicyclic hydrocarbon having up to 12 carbon atoms and at least 5 ring carbon atoms;

(D) at least 5 percent of styrene or alpha-methyl styrene;

(E) 0 to 9.9 percent of 4-methylstyrene;

(F) 0 to 10 percent of a copolymerizable monomer, different from (A)–(E) whose solubility in water is less than 50 g per liter at 25° C. and which is an alpha-olefin, a halogenated olefin, an ester of an unsaturated dicarboxylic acid, or a vinyl ester of a C_3–C_8 carboxylic acid; and

(G) 0 to 10 percent of acrylonitrile, methacrylonitrile, or a crosslinking monomer having in its molecule more than one group capable of free radical polymerization,

all said percentages being by weight of said copolymer.

4,709,001

IN SITU LOW TEMPERATURE SILOXANE GEL

Myron T. Maxson, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

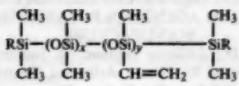
Filed Jan. 2, 1987, Ser. No. 290

Int. Cl.[4] C08G *77/06*

U.S. Cl. 528—15 **18 Claims**

1. A composition which cures to a gel exhibiting low temperature properties comprising the product obtained by mixing

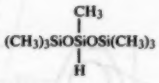
(A) a polydiorganosiloxane having the general formula



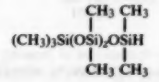
in which R is methyl or vinyl, x has a value of from 50 to 1,000 and y has a value of from $0.04(x+y)$ to $0.28(x+y)$, where $x+y$ equals 100 mole percent.

(B) an methylhydrogensiloxane crosslinking mixture consisting of

(1) a monofunctional methylhydrogensiloxane selected from the group consisting of

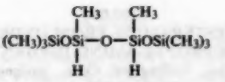


and

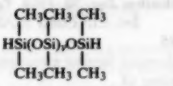


in which z has a value of from 0 to 30, and

(2) a difunctional methylhydrogensiloxane selected from the group consisting of



and



in which v has a value of from 0 to 30, and

(C) an addition reaction catalyst.

4,709,002

METHOD FOR THE PREPARATION OF RIGID NON-CELLULAR REACTION INJECTION MOLDED THERMOSET POLYISOCYANURATE COMPOSITIONS

Usama E. Younes, Newtown Square, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jun. 5, 1986, Ser. No. 871,003

Int. Cl.[4] C08G *18/08, 18/18;* **C08J** *75/00*

U.S. Cl. 528—53 **10 Claims**

1. A method for the preparation of rigid non-cellular reaction injection molded polyisocyanurate thermoset polymer composition which comprises injecting at least two steams via a RIM machine into a mold cavity of the desired configuration to react at temperatures of from about ambient to about 140° C. a reaction mixture comprising at least one stream of an organic di-or polyisocyanate and a second stream of from about 5 to about 50 parts by weight of a cyclic alkylene carbonate, based on 100 parts of the isocyanate-carbonate composition, in the presence of a soluble adduct of a tertiary amine and a cyclic alkylene carbonate as catalyst at a concentration of from about 0.01 to about 5.0 weight percent based on the total composition.

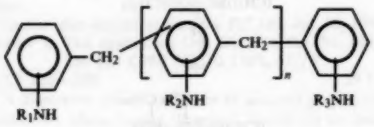
4,709,003

ALKYLATED TRIAMINES AND HIGHER POLYAMINES AS CURING AGENTS IN POLYURETHANE MANUFACTURE

Ray V. Scott, Jr., Addison; William M. Baumann, Downers Grove, and David W. House, Arlington Heights, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Mar. 6, 1986, Ser. No. 836,872
Int. Cl.[4] C08G *18/32*
U.S. Cl. 528—60 **26 Claims**

1. A polyurethane resulting from the reaction of an isocyanate-terminated urethane prepolymer, said prepolymer being the adduct of from about 1.5 to about 4.0 equivalents of a polyisocyanate with 1 equivalent of a polyol, with from about 0.80 to 1.2 equivalents of an alkylated aromatic polyamine of the structure,



where R_1 and R_3 are independently selected from the group consisting of an alkyl or alkenyl moiety containing from 1 to about 20 carbon atoms, and R_2 is hydrogen, alkyl, or an alkenyl moiety containing from 1 to about 20 carbon atoms, and where n is an integer from 1 to about 10.

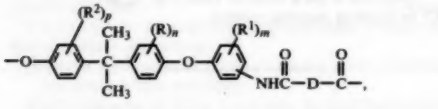
4,709,004

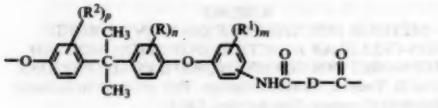
POLYESTERAMIDE FROM HYDROXY PHENYL-ISOPROPYL-AMINO DIPHENYL ETHER

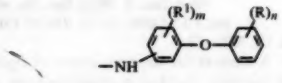
Shenghong A. Dai, Wallingford, Conn., assignor to The Dow Chemical Company, Midland, Mich.

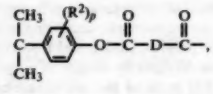
Division of Ser. No. 668,540, Nov. 5, 1984, Pat. No. 4,618,727. This application Jun. 30, 1986, Ser. No. 880,540
Int. Cl.[4] C08G *63/00*
U.S. Cl. 528—185 **4 Claims**

1. A polyamide-ester having a recurring unit selected from the group consisting of









and mixtures thereof wherein R, R^1, and R^2 are independently selected from the group consisting of alkyl, aryl, aralkyl, and cycloalkyl; n, m, and p each have an independent value of 0 to 4, inclusive; and D is selected from the group consisting of alkylene, arylene, and cycloalkylene.

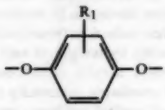
4,709,005

THERMOTROPIC AROMATIC POLYESTERS

Jean-Pierre Quentin, Lyons, France, assignor to Rhone-Poulenc Recherches, Courbevoie, France

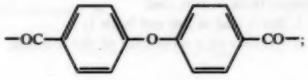
Filed Jan. 13, 1986, Ser. No. 818,290
Claims priority, application France, Jan. 11, 1985, 85 00552
Int. Cl.[4] C08G *63/02*
U.S. Cl. 528—194 **11 Claims**

1. A moldable thermotropic aromatic copolyester having an inherent viscosity of at least 0.3 dlg^{-1} and a flow temperature of from 200° to 350° C., comprising recurring structural units of the formulae (I), (II), (III) and (IV), wherein (I) is the structural unit:

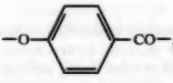


in which R_1 is methyl, ethyl, chlorine or bromide, said structural units (I) either being identical or different; (II) is the structural unit:

(III) is the structural unit:



(IV) is the structural unit:



and further wherein the molar ratio of the structural units (I) relative to the total amount of the structural units (II)+(III) ranges from 0.95 to 1.05; the amount of the structural units (II) in the mixture of structural units (II)+(III) ranges from 0 to 70 mole % and the amount of the structural units (III) in said mixture ranges from 100 to 30 mole %; and the amount of the structural units (IV), relative to the amount of the structural units (I), ranges from 10 to 300 mole %.

7. A process for the preparation of the thermotropic aromatic polyester as defined by claim **1**, comprising interreacting (1) a diester of methyl- and/or ethyl- and/or chloro- and/or bromohydroquinone, optionally mixed with a diester or diesters of another diphenol, or of other diphenols, and/or at least one hydroquinone disubstituted with the aforesaid substituents, (2) optionally terephthalic acid itself or optionally mixed with another aromatic dicarboxylic acid, (3) 4,4′-dicarboxydiphenyl ether, and (4) an ester of para-hydroxybenzoic acid itself or optionally mixed with an ester of another aromatic hydroxy acid, the said diphenol diester and the said hydroxy acid ester being derived from an alkanoic acid containing from 2 to 6 carbon atoms, and further wherein the molar ratio diester(s) of diphenol(s)/total diacids ranges from 0.95 to 1.05, the amount of terephthalic acid in the mixture of terephthalic acid+4,4′-

dicarboxydiphenyl ether ranges from 0 to 70 mole %, the amount of ester of para-hydroxybenzoic acid ranges from 10 to 300 mole % relative to the amount of diester(s) of monosubstituted hydroquinone(s), and the total amount of said reactants, other than the diester(s) of monosubstituted hydroquinone(s), terephthalic acid, 4,4'-dicarboxydiphenyl ether and the ester of para-hydroxybenzoic acid, does not exceed 10 mole % relative to the amount of diester(s) of monosubstituted hydroquinone(s).

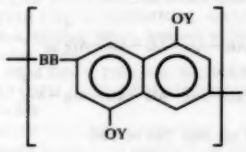
4,709,006

POLYBENZOBISTHIAZOLE FROM ARYLOXY NAPHTHALIC DIACID

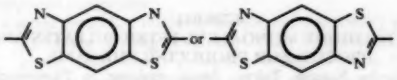
Tsu-Tzu Tsai, Dayton, and Fred E. Arnold, Centerville, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 16, 1986, Ser. No. 852,698
Int. Cl.[4] C08G *75/32*
U.S. Cl. 528—208 **2 Claims**

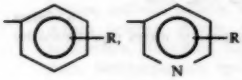
1. A polymer having repeating units of the general formula

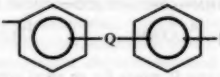


wherein BB is



Y is





R is —H or a C_1 to C_3 alkyl group, and Q is —O— or —S—.

4,709,007

PREPARATION OF AROMATIC POLYMERS

Viktors Jansons, Los Gatos, and Heinrich C. Gors, Mountain View, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 594,503, Mar. 29, 1984, abandoned, which is a continuation-in-part of Ser. No. 481,083, Mar. 31, 1983, abandoned. This application Oct. 23, 1986, Ser. No. 922,837
Int. Cl.[4] C08G *8/02*
U.S. Cl. 528—222 **3 Claims**

1. A method of producing a poly(arylene ether ketone) which comprises polymerizing a monomer system comprising:

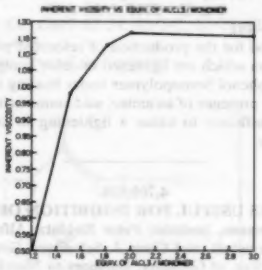
(I) (i) phosgene or an aromatic diacid dihalide together with (ii) a polynuclear aromatic comonomer containing two active hydrogen atoms

or

(II) a polynuclear monomer containing both an acid acid halide group and an active hydrogen atom,

in a reaction medium comprising

(a) a Lewis base present in an amount up to about 2 equivalents per equivalent of acid halide groups present in the monomer system



and

(b) a Lewis acid present in an amount of at least one equivalent per equivalent of carbonyl groups present, plus an equivalent per equivalvent of Lewis base present, plus an amount effective to act as a catalyst for the polymerization.

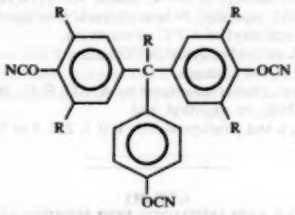
4,709,008

BLEND OF TRIS (CYANATOPHENYL) ALKANE AND BIS(CYANATOPHENYL) ALKANE

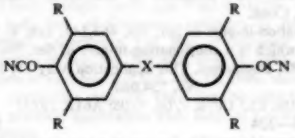
David A. Shimp, Prospect, Ky., assignor to Interez, Inc., Louisville, Ky.

Filed Jun. 30, 1986, Ser. No. 880,529
Int. Cl.[4] C08G *83/00*
U.S. Cl. 528—422 **14 Claims**

1. A curable composition consisting essentially of a blend of a tricyanate ester and a dicyanate ester in the amounts of about 90 to about 10 parts by weight of the tricyanate ester and about 10 to about 90 parts of the dicyanate ester, the total being 100 parts wherein the tricyanate ester has the structural formula:



and the dicyanate ester has the structural formula:



wherein each R is H or methyl and is the same or different and wherein X is methylene, alkylidene having 2 to 4 carbon atoms, oxygen (—O—), or divalent sulfur (—S—).

4,709,009

METHOD FOR THE PRODUCTION OF REFORMED P-VINYLPHENOL POLYMERS WHICH ARE LIGHTENED IN COLOR

Hiroshi Fujiwara; Tadashi Matsumoto, and Masaaki Sekiya, all of Saitama, Japan, assignors to Maruzen Petrochemical Co., Ltd., Tokyo, Japan

Filed Jun. 3, 1985, Ser. No. 740,456
Claims priority, application Japan, Jun. 1, 1984, 59-113556
Int. Cl.[4] C08F *6/06, 6/00*
U.S. Cl. 528—481 **18 Claims**

1. A method for the production of reformed p-vinylphenol homopolymers which are lightened in color comprising treating a p-vinylphenol homopolymer under heating at 150° C. to 350° C. in the presence of an amine, said amine being present in an amount sufficient to cause a lightening in color of said homopolymer.

4,709,010

PEPTIDES USEFUL FOR INHIBITION OF RENIN

Günter Hölzemann, Seeheim; Peter Raddatz; Alfred Jonczyk, both of Darmstadt, and Claus J. Schmitges, Gross-Umstadt, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Oct. 18, 1985, Ser. No. 789,286
Claims priority, application Fed. Rep. of Germany, Oct. 20, 1984, 3438545
Int. Cl.[4] C07C *103/52;* **A61K** *37/02, 49/00*
U.S. Cl. 530—323 **19 Claims**

1. A peptide of the formula

$$X—Z—NH—CHR—CHOH—CH_2—CO—N-H—CHR^1—CH_2—NH—CHY—C_nH_{2n}—R^2$$

wherein

X is H, $R^3—O—CH_2—CO—$, $R^3—O—CO—$, $R^3—CH_2—O—CO—$ or $R^3—C_mH_{2m}—CO—$,

is 1 to 4 aminoacids bonded together to form a peptide, the amino acids being Abu, Ala, Arg, Asn, Dab, Gln, Gly, His, Ile, Leu, Lys, Met, NLeu, Orn, Phe, Pro, Trp, Tyr or Val,

is A, Ar-C_{1-4}-alkyl or cycloalkyl-alkyl of 4–11 C atoms in total,

R^1 is H or A,

Y is H, A, $—C_pH_{2p}—OR^4$, $—C_pH_{2p}—NHR^4$, $—COOR^4$, $—CONHR^4$ or $—CONA_2$,

R^2 is A, cycloalkyl of 3–7 C atoms, Ar, pyridyl, indolyl, imidazolyl, piperidyl, N-benzylpiperidyl or piperazinyl,

R^3 is A, cycloalkyl of 3–7 C atoms or Ar,

R^4 is H, A or cycloalkyl of 3–7 C atoms,

A is alkyl of 1–6 C atoms,

Ar is phenyl, phenyl substituted by A, AO, F, Cl, Br, I, CF_3, OH or NH_2, or naphthyl, and

each of m, n and p independently is 0, 1, 2, 3, 4 or 5, or a salt thereof.

4,709,011

MATERIALS AND METHODS FOR HERPES SIMPLEX VIRUS VACCINATION

Gary H. Cohen, Havertown, Pa., and Roselyn J. Eisenberg, Haddonfield, N.J., assignors to University Patents, Inc., Westport, Conn.

Continuation-in-part of Ser. No. 463,141, Feb. 4, 1983, abandoned, which is a continuation-in-part of Ser. No. 350,021, Feb. 18, 1982, abandoned. This application May 15, 1985, Ser. No. 734,063
Int. Cl.[4] C07K *7/06, 7/08;* **A61K** *39/12*
U.S. Cl. 530—324 **10 Claims**

1. A polypeptide suitable for use in a vaccination procedure for generating an immunological response protective against a Herpes simplex virus disease state, said polypeptide comprising the following amino acid sequence:

NH_2-Lys-Try-Ala-Leu-Ala-Asp-Ala-Ser-Leu-Lys-Met-Ala-Asp-Pro-Asn-Arg-COOH.

4,709,012

NOVEL INHIBITOR PEPTIDES

Steven P. Adams, St. Charles; Dwight A. Towler, St. Louis, both of Mo., and Luis Glaser, Miami, Fla., assignors to Washington University, St. Louis, Mo.

Filed Aug. 7, 1986, Ser. No. 894,185
Int. Cl.[4] C07K *7/06*
U.S. Cl. 530—328 **3 Claims**

1. A peptide inhibitor of myristoylating enzymes having an amino acid sequence selected from the group consisting of the following sequences or a physiologically acceptable amide or salt derivative thereof:

$$\overset{1}{Gly}—R—Ala—Ala—Ala—\overset{6}{Ala},$$

$$\overset{1}{Gly}—R—Ala—Ala—Ala—Ala—\overset{7}{Arg}\ \text{or}$$

$$\overset{1}{Gly}—R—Ala—Ala—Ala—Ala—Arg—\overset{8}{Arg},$$

wherein R = Leu, Phe, Tyr or Val.

4,709,013

GLUTATHIONE MONOALKYL ESTER SULFATES AND PROCESS FOR PRODUCING THE SAME

Yoshinobu Nagano, Tokyo, Japan, assignor to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Filed May 30, 1986, Ser. No. 869,187
Claims priority, application Japan, Jun. 7, 1985, 60-123930
Int. Cl.[4] C07K *7/02, 5/08*
U.S. Cl. 530—332 **6 Claims**

1. Sulfates of glutathione monoalkyl esters represented by the following general formula

$$H_2N—\underset{\underset{COOH}{|}}{CHCH_2CH_2CO}—NH\underset{\underset{CH_2SH}{|}}{CHCO}—NHCH_2COOR.\tfrac{1}{2}H_2SO_4$$

wherein R stands for an alkyl group of 1 to 10 carbon atoms.

4,709,014

PREPARATION OF PEPTIDES WITH C-TERMINAL PROLINE AMIDE

Hidetsune Tamaoki, Hiromachi, Japan, assignor to Sankyo Company Limited, Tokyo, Japan

Filed Apr. 1, 1986, Ser. No. 846,877
Claims priority, application Japan, Apr. 8, 1985, 60-72705
Int. Cl.[4] C07K *1/02, 5/08, 5/10, 7/08, 7/06, 7/38, 7/16, 7/20*
U.S. Cl. 530—333 **6 Claims**

1. A process for the preparation of a peptide having C-terminal proline amide, which comprises reacting in aqueous solution a peptide substrate having a C-terminus selected from the group consisting of prolyl-leucine, prolyl-isoleucine, prolyl-valine, and prolyl-phenylalanine with carboxypeptidase Y in the presence of ammonia.

4,709,015

MONOCLONAL ANTIBODY TO HUMAN SUPPRESSOR T CELLS

Patrick C. Kung, Bridgewater, and Gideon Goldstein, Short Hills, both of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Division of Ser. No. 432,460, Oct. 4, 1982, which is a division of Ser. No. 99,969, Dec. 4, 1979, Pat. No. 4,361,550. This application Aug. 9, 1984, Ser. No. 639,161

The portion of the term of this patent subsequent to Nov. 30, 1999, has been disclaimed.

Int. Cl.[4] G01N *33/577;* A61K *39/00*

U.S. Cl. 530—387 3 Claims

1. A monoclonal antibody produced by a hybridoma formed by fusion of cells from a mouse myeloma line and spleen cells from a mouse previously immunized with human thymocytes, which antibody reacts with human suppressor T cells.

4,709,016

MOLECULAR ANALYTICAL RELEASE TAGS AND THEIR USE IN CHEMICAL ANALYSIS

Roger W. Giese, Quincy, Mass., assignor to Northeastern University, Boston, Mass.

Filed Feb. 1, 1982, Ser. No. 344,394

Int. Cl.[4] C07H *15/12;* C07D *213/28;* G01N *53/00*

U.S. Cl. 530—389 10 Claims

1. A molecular conjugate, comprising: a release tag compound covalently bound to an analyte to be analytically determined or to a specific binding partner thereof; said specific binding partner being selected from the group consisting of antibodies for the analyte, and DNA probes; said release tag compound comprising:

a signal group S, a release group Re, and a reactivity group Rx, group S being covalently linked to group Re, and group being further covalently linked to group Rx to define structure S—Re—Rx for said compound;

Rx further comprising a functional group capable of forming a covalent bond with another molecule, said functional group being selected from the group consisting of silyl halides, sulfonyl halides, acid halides, acid anhydrides, α-halo ketones, diones, maleimides, diazonium salts, imidoesters, aldehydes, halogenated nitrophenyls, arylazides, isothiocyanates, epoxides, carbenes, nitrenes, sulfenyl halides, amines, and hydrazides;

Re further comprising a functionality selected from the group consisting of methionylamides, vicinyl glycols, olefins, β-phenylethylamine oxides, and benzyl ethers; and

S further comprising a halogenated electron-absorbing organic group;

groups S and Re being mutually selected such that upon cleavage of said release tag at release group Re, signal group S is released in a volatile form suitable for electron capture determination in the gas phase.

4,709,017

MODIFIED TOXIC VACCINES

R. John Collier, Wellesley Hills, and Stephen F. Carroll, Brookline, both of Mass., assignors to President and Fellows of Harvard College, Cambridge, Mass.

Filed Jun. 7, 1985, Ser. No. 742,618

Int. Cl.[4] C07K *13/00*

U.S. Cl. 530—350 2 Claims

1. Diphtheria toxin, fragment A, modified by the deletion of Glu-148 or by the substitution of Asp for Glu-148.

4,709,018

FIBER-REACTIVE DYES CONTAINING HALOPYRIMIDINE RADICALS TO WHICH A VINYLSULFONYL OR THE LIKE GROUP IS ATTACHED BY MEANS OF A BRIDGE MEMBER

Karl Seitz, Oberwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

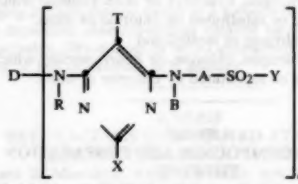
Filed Aug. 30, 1984, Ser. No. 645,796

Claims priority, application Switzerland, Aug. 30, 1983, 4751/83

Int. Cl.[4] C09B *62/24, 62/245, 62/25, 62/255*

U.S. Cl. 534—618 19 Claims

1. A reactive dye of the formula



in which D is the radical of a monoazo, polyazo, metal complex azo, anthraquinone, phthalocyanine, formazan, azomethine, dioxazine, phenazine, stilbene, triphenylmethane, xanthene, thioxanthone, nitroaryl, naphthoquinone, pyrenequinone or perylenetetracarbimid dye, R is hydrogen or C_{1-4}-alkyl unsubstituted or substituted by halogen, hydroxyl, cyano, C_{1-4}-alkoxy, carboxy or sulfo, or is methoxycarbonylmethyl, ethoxycarbonylmethyl, aminosulfonylmethyl or β-sulfatoethyl; X is halogen, low molecular alkylsulfonyl, phenylsulfonyl, a sulfonic acid, phosphonic acid or quaternised ammonium group; A is arylene unsubstituted or substituted by methyl, ethyl, methoxy, ethoxy, halogen, nitro, cyano, acetylamino, hydroxyl, carboxyl or sulfo or is C_{2-6}-alkylene unsubstituted or substituted by chlorine, cyano or hydroxyl; Y is $-CH=CH_2$ or $-CH_2CH_2-Z$; Z is sulfato, thiosulfato, acetato, phosphato or halogen; B is hydrogen, alkyl unsubstituted or substituted by halogen, hydroxy, cyan, alkoxy, methoxycarbonyl, ethoxycarbonyl, aminosulfonyl, sulfato, carboxy or sulfo, or is cyclohexyl, or phenyl unsubstituted or substituted by methyl, ethyl, methoxy, ethoxy, chloro, bromo, carboxy, sulfo or sulfomethyl, or is a radical of the formula

$$-A-SO_2-Y$$

in which A and Y are as defined above; T is nitro, alkoxysulfonyl, alkylsulfonyl, alkylsulfinyl, cyano, alkoxycarbonyl, carboxyl, alkanoyl, chlorine or hydroxyl; and n is 1 or 2.

4,709,019

ANTHRAQUINONE-AZO PYRIDONE-CONTAINING COMPOUNDS

Meinhard Rolf; Rütger Neeff, and Walter Müller, all of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

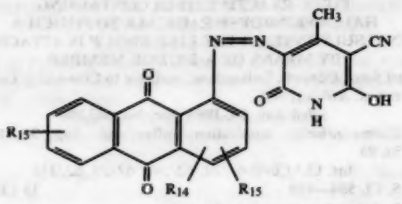
Continuation of Ser. No. 301,841, Sep. 14, 1981, which is a continuation of Ser. No. 167,559, Jul. 11, 1980, abandoned. This application Apr. 21, 1983, Ser. No. 486,878

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1979, 2930481

Int. Cl.[4] C09B *29/01, 29/36;* C09D *1/08, 5/00*

U.S. Cl. 534—655 4 Claims

1. Anthraquinone-azo compound of the formula



wherein

R_{13} denotes hydrogen, hydroxyl, or benzoylamino which is unsubstituted or substituted by chlorine or nitro,

R_{14} denotes hydrogen or methyl and

R_{15} denotes hydrogen, chlorine, or benzoylamino which is unsubstituted or substituted by chlorine or nitro.

4,709,020

HEPTAOSE COMPOUNDS AND PREPARATION THEREOF

Elli Rauscher, Munich; Eugen Schaich, Weilheim; Ulrich Neumann, Peissenberg/Obb.; August Wahlefeld, Hohenpeissenberg; Wolfgang Gruber, Tutzing-Unterzeismering, and Bernhard Empl, Weilheim, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim-Waldhof, Fed. Rep. of Germany

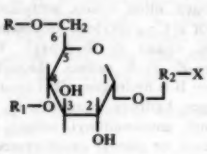
Filed Aug. 3, 1984, Ser. No. 637,517

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1983, 3328616

Int. Cl.[4] C07H *15/04*

U.S. Cl. 536—17.8 **21 Claims**

1. A compound of the formula:



(I)

in which R and R_1, independently of one another, each represent a straight-chained or branched alkyl or alkoyl radical containing from 1 to 6 carbon atoms or a phenyl radical or R and R_1 together form a methylene bridge, the hydrogen atoms of which, independently of one another, can each be substituted by an alkyl radical containing up to 5 carbon atoms or a phenyl radical, R_2 represents an oligoglucoside residue containing 2 to 7 glucose units and X is a hydrogen or a nitrophenyl residue.

4,709,021

COPPER PHTHALOCYANINE PIGMENTS

Thomas E. Donegan, Holland, and Timothy G. Leary, Grand Haven, both of Mich., assignors to BASF Corporation, Parsippany, N.J.

Filed Nov. 6, 1985, Ser. No. 795,487

Int. Cl.[4] C09B *47/04*

U.S. Cl. 540—141 **14 Claims**

1. A process for preparing a digested phthalocyanine crude comprising the steps of:

I. mixing in a high shear mixer, while allowing the mass to generate heat so that the temperature achieved is between ambient and 120° C.,

(a) premilled copper phthalocyanine crude pigment,

(b) between 0.5 percent and 1.5 percent, based on weight of premilled copper phthalocyanine, of a tri-(diethylamino-methylene) copper phthalocyanine or an organic salt thereof, and

(c) between 20 percent and 100 percent, based on weight of premilled copper phthalocyanine, of a phase director and

II. digesting the mixture in water or an aqueous mineral acid solution, at a temperature between about 50° C. and 100° C.

4,709,022

PHEOPHORBIDE DERIVATIVES AND ALKALINE SALTS THEREOF

Isao Sakata, 1766-4 Obirai, Kasuoka City, Okayama Pref.; Susumu Nakajima, 4-4-34 Gojo, Midorigaoka, Asahikawa City, Hokkaido; Koichi Koshimuzi, 85-10 Horensan soinishi cho, Nara City, Nara Pref.; Natsuki Samejima, A-42 Idai Shukusha, 3-3 Nijo, Midorigaoka, Ashahikawa City, Hokkaido; Kazumi Inohara, 3-9-7 Mikado cho, Fukuyama City, Hiroshima Pref., and Hiroyuki Takata, 2098 Satomi, Satosho cho, Asakuchi gun, Okayama Pref., all of Japan

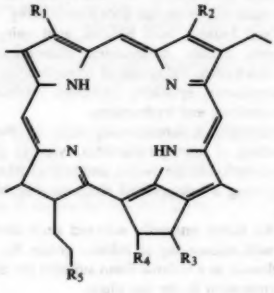
Filed Jun. 19, 1985, Ser. No. 746,386

Claims priority, application Japan, Jun. 22, 1984, 59-128478

Int. Cl.[4] C07D *487/22*

U.S. Cl. 540—145 **1 Claim**

1. A pheophorbide derivative and its alkaline salts having the general formula (A):



(A)

wherein

R_1 represents $-CH=CH_2$, $-CH(OH)CH_3$, $-CH(OCH_2CH_2OH)CH_3$ or $-CH(OCOCH_3)CH_3$

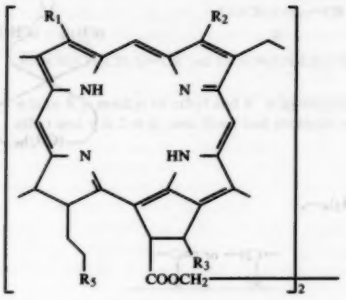
R_2 represents $-CH_3$, $-CHO$ or $-CH_2OH$

R_3 represents $=O$, $-OH$ or $-OCOCH_3$

R_4 represents $-H$, $-COOCH_3$, $-COOCH_2CH_2OH$, $-COOCH_2CH_2OCOCH_3$, or a $-CONH-$ containing residue of an amino acid and

R_5 represents $-COOH$, $-COONa$ or $-COOCH_3$;

provided that R_2 is not $-CH_3$ or $-CH_2OH$ when R_3 is $-OH$ or $-OCOCH_3$, R_5 is neither $-COOH$ nor $-COONa$ when R_4 is $-COOCH_3$ and R_3 is $=O$, $-OH$, or $-COOCH_3$, and R_5 is neither $-COOH$ nor $-COOCH_3$ when R_4 is $-COOCH_3$, or $-H$; and dimeric pheophorbide derivatives and alkaline salts thereof represented by the general formula (B):



(B)

where R_1 through R_5 represent residual radicals identical to those in the general formula (A) provided that R_5 is not corboxy methyl.

4,709,023

PROCESS FOR THE PREPARATION OF 7-AMINO-3-(3-FORMAMIDOPYRIDINIUM)METHYL-3-CEPHEM-4-CARBOXYLATE, AND ITS USE FOR THE SYNTHESIS OF β-LACTAM ANTIBIOTICS

Rolf Angerbauer, Wuppertal, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

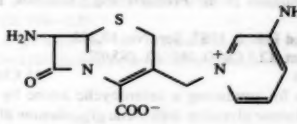
Filed May 6, 1985, Ser. No. 730,980

Claims priority, application Fed. Rep. of Germany, May 22, 1984, 3419014

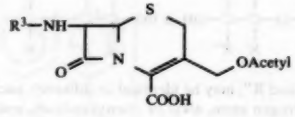
Int. Cl.⁴ C07D *501/18;* **A61K** *31/545*

U.S. Cl. 540—224 **5 Claims**

1. A process for the preparation of 7-amino-3-(3-formamidopyridinium)methyl-3-cephem-4-carboxylate of the formula



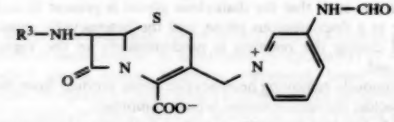
comprising (a) reacting a compound of the formula



in which

R^3 is a phenacetyl or a thienylacetyl group,

with a slight excess of 3-formamidopyridine to give the compound of the formula



wherein said reaction is carried out in dimethylformanide at temperatures between 60° to 80° in the presence of NaBr, KI, KSCN, NaSCN or LiI, and (b) splitting off the R^3 radical enzymatically with immobilized amino-protective penicillin G acylase at pH 7–8.

4,709,024

PRODUCTION OF EPSILON-CAPROLACTAM

Hiroshi Sato; Kenichi Hirose, both of Osaka; Norio Ishii, Ehime, and Youichi Umada, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Osaka, Japan

Filed Aug. 13, 1986, Ser. No. 896,008

Claims priority, application Japan, Aug. 28, 1985, 60-190593; Feb. 25, 1986, 61-40927

Int. Cl.⁴ C07D *201/04*

U.S. Cl. 540—536 **14 Claims**

1. A method for preparing ε-caprolactam which comprises bringing cyclohexanone oxime in a gaseous phase into contact with crystalline alumino-silicate catalyst having 1–12 of constraint index, 500 or more of Si/Al atomic ratio and 5μ equivalent/g or less of external acid amount.

4,709,025

BETA-LACTAMS SUBSTITUTED AT C-4 WITH SUBSTITUTED AMINOOXYMETHYL

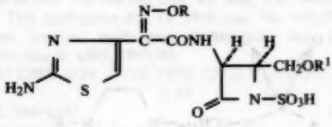
Richard E. Mewshaw, King of Prussia, and Thomas J. Commons, Wayne, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Jan. 20, 1987, Ser. No. 4,529

Int. Cl.⁴ C07D *417/12, 417/14;* **A61K** *31/425, 31/55*

U.S. Cl. 540—355 **15 Claims**

1. A compound of the formula:



in which

R is alkyl of 1 to 6 carbon atoms, carboxyalkyl of 2 to 6 carbon atoms or alkoxycarbonylalkyl wherein the alkyl and alkoxy moieties contain, independently, 1 to 6 carbon atoms;

R^1 is alkylideneamino of 2 to 6 carbon atoms, alkanoylamino of 2 to 6 carbon atoms, carboxyalkylideneamino of 2 to 6 carbon atoms, alkylsulfonylamino of 1 to 6 carbon atoms, alkoxycarbonylalkylsulfonylamino of 3 to 13 carbon atoms, or N,N-cyclodialkanoylamino of 4 to 6 carbon atoms;

or a pharmaceutically acceptable salt thereof.

4,709,026

KETOSULTAMS

Albert Bender, Nuremberg, and Dieter Guenther, Kelkheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

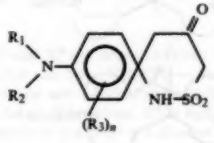
Filed Feb. 20, 1986, Ser. No. 831,291

Claims priority, application Fed. Rep. of Germany, Feb. 23, 1985, 3506435

Int. Cl.⁴ C07D *279/02*

U.S. Cl. 544—3 **2 Claims**

1. A ketosultam having the formula:



I

wherein

R_1 and R_2 are the same or different, and each is selected from the group consisting of a hydrogen atom, a phenyl group and a C_1-to-C_8 alkyl group which can be unsubstituted or substituted by at least one from the group consisting of a halogen atom, a hydroxyl group, a cyano group and an alkoxy group having 1 to 4 carbon atoms,

R_3 is a hydrogen atom, a C_1-to-C_4 alkyl group or a C_1-to-C_4 alkoxy group,

n is a number from 1 to 4 or

R_1, R_2 and R_3, together with the aminophenyl radical of said ketosultam to which each is substituted, all form a julolidinyl radical or a N-(C_1-to-C_3)-alkylcarbazol-3-yl radical.

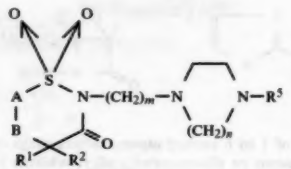
4,709,027

BICYCLIC SPIROSULFONIMIDES WITH PSYCHOTROPIC ACTIVITY

Magid A. Abou-Gharbia, Wilmington, Del., and Guy A. Schiehser, Malvern, Pa., assignors to American Home Products Corporation, New York, N.Y.

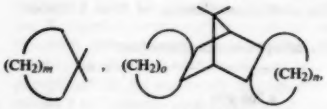
Filed Jun. 25, 1986, Ser. No. 878,448
Int. Cl.[4] C07D *417/06*
U.S. Cl. 544—6 **5 Claims**

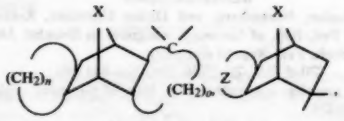
1. A compound having the formula

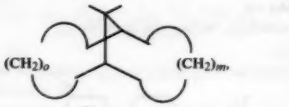


wherein

R^1 and R^2 are each, independently, hydrogen or lower alkyl, or R^1 and R^2 taken together represent



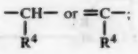




-continued

A is NR^3;

B is $-(CH_2)_n-$,



R^3 is hydrogen or lower alkyl;

R^4 is hydrogen, lower alkyl, or halo;

R^5 is unsubstituted or substituted phenyl, 2-pyridinyl, 2-pyrimidinyl, 2-pyrazinyl or 3-pyridazinyl, where the substituents are selected from the group lower alkyl, lower alkoxy, halo, cyano, nitro and trifluoromethyl;

Z is $-(CH_2)_n-$ or vinylene;

X is lower alkylene, vinylene or O;

m is 2–5;

n is 1–3;

o is 1–5;

and the pharmaceutically acceptable salts thereof.

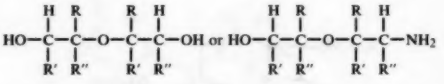
4,709,028

SYNTHESIS OF HETEROCYCLIC AMINES VIA THE REACTION OF DIALKYLENE GLYCOL AND AMMONIA

Thomas A. Johnson, Orefield, and Cawas A. Cooper, Macungie, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 3, 1987, Ser. No. 10,353
Int. Cl.[4] C07D *265/30, 295/02*
U.S. Cl. 544—106 **15 Claims**

1. In a process for producing a heterocyclic amine by the reaction of a dialkylene glycol or dialkylene glycolamine of the formula:



where R, R′, and R″, may be identical or different, each representing a hydrogen atom, alkyl or phenyl radicals, and ammonia in a fixed bed catalytic reactor, said reaction being carried out in the presence of hydrogen and a hydrogenation-dehydrogenation catalyst wherein at least 1 mole percent of said dialkylene glycol or dialkylene glycolamine is maintained in the liquid phase; said dialkylene glycol or dialkylene glycolamine and ammonia being passed downflow through said reactor at a rate such that the dialkylene glycol is present in said reactor as a discontinuous phase, and the heterocyclic amine formed during the reaction is predominantly in the vapor phase; and

continuously removing heterocyclic amine product from the reactor; the improvement which comprises:

introducing said dialkylene glycol or dialkylene glycolamine or a solution containing from about 30–80% by weight of said dialkylene glycol or dialkylene glycolamine in a dialkyl ether of a polyalkylene glycol of the formula:

$$R(OCH_2CH)_n—OR$$
$$R'$$

$R(OCH_2CH_2CH_2)_n—OR$ and $R(OCH_2CH_2CH_2CH_2)_nOR$

where R is methyl or ethyl and R′ is hydrogen, methyl or ethyl and n is 2–6 to said fixed bed catalytic reactor.

4,709,029

PROCESS FOR THE PREPARATION OF PERYLENE-3,4,9,10-TETRACARBOXYLIC ACID MONOANHYDRIDE MONOIMIDES

Ernst Spietschka, Idstein, and Helmut Tröster, Königstein, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 599,202, Apr. 11, 1984, Pat. No. 4,599,408, which is a continuation of Ser. No. 261,454, May 7, 1981, abandoned. This application Jan. 23, 1986, Ser. No. 821,618

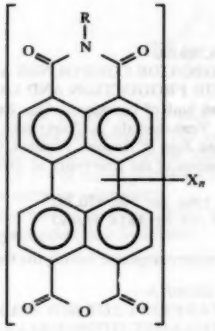
Claims priority, application Fed. Rep. of Germany, May 5, 1980, 3017185

The portion of the term of this patent subsequent to Jul. 8, 2003, has been disclaimed.

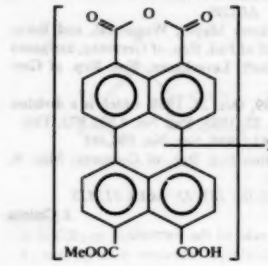
Int. Cl.⁴ C07D *491/06, 413/06*

U.S. Cl. 544—125 **6 Claims**

1. A process for the preparation of perylene-3,4,9,10-tetracarboxylic acid anhydride monoimides of the formula



in which R is hydrogen, amino or alkyl of 1 to 4 carbon atoms which is unsubstituted or substituted by cycloalkyl of 4 to 8 carbon atoms, cyano, hydroxy, carbamoyl, lower dialkylamino, morpholyl, phenyl which is unsubstituted or substituted by halogen or lower alkyl, or alkoxy of 1 of 8 carbon atoms which is unsubstituted or substituted by lower alkoxy; X is chlorine or bromine; and n is a number from 0 to 4, which comprises reacting a monoalkali metal salt of perylene-3,4,9,10-tetracarboxylic acid monoanhydride, of the formula



in which Me is sodium or potassium and X and n have the abovementioned meaning, with a compound of the formula $R—NH_2$ in which R has the abovementioned meaning, at 0°–130° C.

4,709,030

NOVEL LIQUID CRYSTAL MIXTURES

Martin Petrzilka, Kaiseraugst, and Martin Schadt, Seltisberg, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

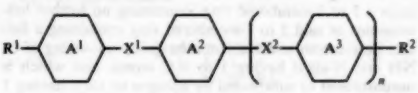
Division of Ser. No. 749,163, Jun. 26, 1985, Pat. No. 4,621,901. This application Jul. 11, 1986, Ser. No. 884,571

Claims priority, application Switzerland, Jul. 12, 1984, 3385/84; May 6, 1985, 1899/85

Int. Cl.⁴ C09K *3/34, 19/42;* **C07C** *13/28, 15/12, 25/18;* **G02F** *1/13*

U.S. Cl. 544—242 **10 Claims**

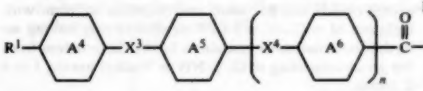
1. A compound of the formula



I

wherein n is the integer 0 or 1; X^1 and X^2 are single covalent bonds or one of the X^1 and X^2 also is —COO—, —OOC— or $—CH_2CH_2—$; the rings A^1, A^2 and A^3 independently are 1,4-phenylene, 2-fluoro-1,4-phenylene or trans-1,4-cyclohexylene or one of these rings also is a 2,5-disubstituted pyrimidine or trans-2,5-disubstituted m-dioxane; R^1 is 4-alkenyl or when positioned on a cyclohexyl ring R^1 also can be 2Z-alkenyl; and R^2 is alkyl, alkoxy, —CN or —NCS; with the proviso that simultaneously R^1 is not 4-pentenyl, ring A^1 is not trans-1,4-cyclohexylene, X^1 is not $—CH_2CH_2—$, ring A^2 is not 1,4-phenylene, n is not the integer 0 and R^2 is not —CN.

8. A compound of the formula



LVa

wherein X^3 and X^4 are single covalent bonds or one of X^3 and X^4 also can be $—CH_2CH_2—$; rings A^4, A^5 and A^6 independently are 1,4-phenylene, 2-fluoro-1,4-phenylene or trans-1,4-cyclohexylene; R^4 is hydrogen or alkyl; n is the integer 0 or 1; and R^1 is 4-alkenyl or when positioned on a cyclohexyl ring R^1 also can be 2Z-alkenyl.

4,709,031
IMIDAZOTHIADIAZOLEALKYLENE CARBOXYLIC ACIDS

Axel Ingendoh, Velbert; Horst Meyer, Wuppertal, and Bernward Garthoff, Hilden, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

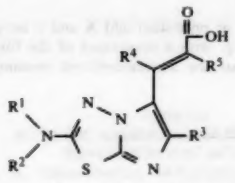
Division of Ser. No. 789,689, Oct. 21, 1985, which is a division of Ser. No. 468,737, Feb. 22, 1983, Pat. No. 4,585,873. This application Jul. 11, 1986, Ser. No. 884,561

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1982, 3208437

Int. Cl.[4] **C07D** *513/04, 285/12;* **A61K** *31/425*

U.S. Cl. 544—333 **2 Claims**

1. An alkanecarboxylic acid of the formula



in which

R^1 represents hydrogen, phenyl, or phenyl substituted by halogen, trifuloromethyl, alkyl, alkoxy, alkylmercapto or alkylamino, each having 1 to 4 carbon atoms in the alkyl and alkoxy, or by amino, or

R^1 represents an unsubstituted hydrocarbon having up to 12 carbon atoms which is uninterrupted by hetero atoms or interrupted once or twice by O, N, NH, N-alkyl having 1 to 4 C atoms, N-phenyl or N-benzyl, and said hydrocarbon being unsubstituted or substituted by hydroxyl, alkyl having 1 to 4 C atoms, trifluoromethyl, halogen, phenyl or alkoxycarbonyl having up to 5 C atoms or by dialkylamino, each alkyl containing 1 to 4 carbon atoms, the two alkyls being unconnected or forming with the nitrogen atom a 5 to 7-membered ring, containing no further heteroatoms or said 5 to 7-membered ring containing a further heteroatom selected from the group consisting of O, NH and N-alkyl having 1 to 4 C atoms, and which is unsubstituted or substituted by halogen or alkyl having 1 to 4 C atoms,

R^2 represents CXR^8,

R^8 has the meaning indicated for R^1 and being identical to or different from R^1, and

X representing oxygen, sulphur or NR^9R^{10},

R^9 and R^{10} being identical or different and representing hydrogen, phenyl, benzyl or alkyl having 1 to 6 carbon atoms, the alkyl and phenyl being unsubstituted or substituted by halogen or alkoxy having 1 to 4 carbon atoms, or represents SO_nR^{11} n denoting 1 or 2 and R^{11} having the meaning indicated for R^1 and being identical to or different from R^1, or R^1 and R^2 together represent a group or the formula $=C(R^{12})\ (Y—R^{13})$, Y representing oxygen, sulphur NH or N-alkyl having 1 to 4 C atoms, and R^{12} and R^{13} each having the meaning indicated for R^1 and being identical to or different from R^1, R^{12} and R^{13} being unconnected or R^{12} and R^{13} connected together to form, with inclusion of =C—Y, a 5 to 7-membered ring having no further heteroatom or contains a further heteroatom from the group consisting of O, S, NH or N-alkyl having 1 to 4 C atoms,

R^3 has the meaning indicated for R^1 and is identical to or different from R^1 or represents unsubstituted phenyl, furyl, thienyl, pyrimidyl or pyridyl, or phenyl, furyl, thienyl, pyrimidyl or pyridyl substituted by 1, 2 or 3 identical or different substituents selected from the group consisting of halogen, nitro, trifluoromethyl, phenyl, alkyl, alkoxy, dialkylamino and SO_n-alkyl wherein n is 0, 1 or 2, the alkyl and alkoxy mentioned each containing 1 to 4 carbon atoms,

R^4 represents hydrogen, trifluoromethyl or alkyl,

R^5 represents hydrogen, cyano, halogen, nitro, alkyl, SO_n-alkyl or CXR^8, the alkyls mentioned containing 1 to 4 carbon atoms and n, X and

R^8 having the meaning indicated above.

4,709,032
ISOQUINOLINESULFONAMIDE DERIVATIVES

Hiroyoski Hidaka, Tsu, and Takanori Sone, Nobeoka, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha and Hiroyoshi Hidaka, both of, Japan

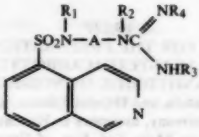
Division of Ser. No. 548,722, Nov. 4, 1983, Pat. No. 4,634,770. This application Oct. 17, 1986, Ser. No. 919,774

Claims priority, application Japan, Nov. 18, 1982, 57-201085

Int. Cl.[4] **C07D** *401/12*

U.S. Cl. 544—363 **8 Claims**

1. A compound of Formula (I):



(I)

wherein

A is a single bond; a C_1–C_{10} alkylene group; or a C_1–C_{10} alkylene group having a C_{1-10} alkyl, phenyl or phenylalkyl group having a C_{1-2} alkyl portion substituent;

R_1 and R_2 are linked directly to form an ethylene group unsubstituted or substituted with a C_{1-4} alkyl substituent;

R_3 and R_4 are each a hydrogen atom, or a C_{1-6} alkyl group and pharmaceutically acceptable acid addition salts thereof.

4,709,033
PYRAZINE DIAZOHYDROXIDE COMPOUNDS AND METHODS FOR THEIR PRODUCTION AND USE

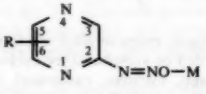
David C. Baker; Elli S. Hand, both of Tuscaloosa, Ala.; Rudiger D. Haugwitz, Bethesda; Venkatachala L. Narayanan, Gaithersburg, both of Md., and Jang B. Rampal, Fremont, Calif., assignors to Board of Trustees of the University of Alabama, University, Ala.

Filed Nov. 13, 1984, Ser. No. 670,202

Int. Cl.[4] **C07D** *241/20;* **A61K** *31/495*

U.S. Cl. 544—336 **7 Claims**

1. A pyrazine diazohydroxide compound having the formula I:



I

where M is an equivalent of an alkali metal or a half-equivalent of an alkaline earth metal and the R-substitution is H, 3-methyl, 5-bromo, 3,6-dimethyl, 5,6-diphenyl or 3,5-bis(phenylthio), with the proviso that M is a metal other than sodium where R is H, 3-methyl or 3,6-dimethyl.

4,709,034

PROCESS FOR THE SYNTHESIS OF HYDROXYALKYL AMINES AND HYDROXYALKYL PIPERAZINES

John A. Marsella, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 14, 1986, Ser. No. 829,680
Int. Cl.[4] C07D *241/04, 85/18*
U.S. Cl. 544—401 22 Claims

1. A process for the synthesis of hydroxyalkyl amines, hydroxyalkyl piperazines, or alkyl piperazines from an alkyl amine or ammonia and an alkylene glycol by reacting said ammonia or alkyl amine and said alkylene glycol in the presence of a substantially soluble catalyst, said catalyst being derived from a catalyst precursor selected from the group of the carbonyl complexes of ruthenium, osmium, iridium, rhodium and rhenium.

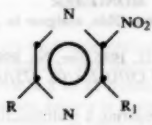
4,709,035

2,6-DISUBSTITUTED DERIVATIVES OF 3-NITROPYRAZINES USEFUL AS ADJUNCTS TO RADIATION THERAPY

George D. Hartman, Lansdale, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 441,203, Nov. 12, 1982, abandoned. This application Sep. 4, 1984, Ser. No. 646,729
Int. Cl.[4] A61K *31/495;* C07D *241/16, 241/24*
U.S. Cl. 544—407 6 Claims

1. A nitropyrazine compound of the formula



I

wherein R and R_1 are each selected from the group consisting of

(a) hydrogen;

(b) carboalkoxy in which the alkoxy group has from 1–3 carbon atoms;

(c)

wherein R_2 and R_3 are each selected from the group consisting of hydrogen and lower alkyl substituents of from 1 to 6 carbon atoms, said alkyl substituent having from 1–4 of the alkyl carbons substituted with a hydroxy or methoxy substituent;

provided tnat at least one of the R and R_1 substituents is a substituent other than hydrogen.

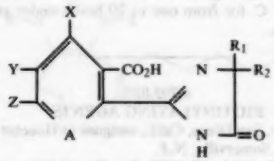
4,709,036

PROCESS FOR THE PREPARATION OF HERBICIDAL 2-(4,4-DISUBSTITUTED-5-OXO-2-IMIDAZOLIN-2-YL)BENZOIC, NICOTINIC AND QUINOLINE-3-CARBOXYLIC ACIDS, ESTERS AND SALTS

Marinus Los, Pennington; Don W. Long, and Gregory P. Withers, both of Lawrenceville, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jun. 13, 1985, Ser. No. 744,705
Int. Cl.[4] C07D *401/04, 233/32*
U.S. Cl. 546—167 12 Claims

1. A process for the preparation of herbicidal 5-oxo-imidazolinyl benzoic, nicotinic and quinoline-3-carboxylic acids of Formula I



(I)

wherein

A is CR_3 or N;

R_1 and R_2 each represent C_1–C_3 alkyl or cyclopropyl, with the proviso that the sum of the number of carbon atoms in R_1 and R_2 is 2 to 5; and when R_1 and R_2 are taken together with the carbon to which they are attached, they may form a C_3–C_6 cycloalkyl ring optionally substituted with methyl;

X is hydrogen, halogen or methyl;

Y and Z are each hydrogen, halogen, C_1–C_6 alkyl, C_1–C_4 hydroxyalkyl, C_1–C_6 alkoxy, C_1–C_4 alkylthio, phenoxy, C_1–C_4 haloalkyl, OCF_2CHF_2; OCF_3, $OCHF_2$, nitro, cyano, C_1–C_4 alkylsulfonyl, NR_4R_5, C_3–C_8 straight or branched alkenyloxy optionally substituted with one to three halogens, C_3–C_8 straight or branched alkynyloxy optionally substituted with one to three halogens, or phenyl optionally substituted with one to two C_1–C_4 alkyl, C_1–C_4 alkoxy or halogen or combinations of any two of these groups;

R_3 is hydrogen, halogen, C_1–C_4 alkyl, C_1–C_4 alkylthio, C_1–C_4 alkoxy, CF_3, NO_2, OCF_3, $OCHF_2$ or OCF_2CHF_2;

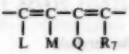
R_4 is hydrogen or C_1–C_4 alkyl;

R_5 is C_1–C_4 alkyl;

and, when taken together, Y and Z may form a ring in which YZ is represented by

(1) the structure: $—(CH_2)_n—$, where n is an integer of 2, 3 or 4; or

(2) by the structure:

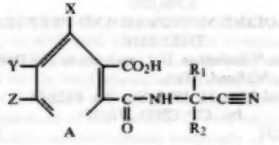


L, M, Q and R_7 are each hydrogen, halogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 alkylthio, C_1–C_4 alkylsulfonyl, C_1–C_4 haloalkyl, difluoromethoxy, trifluoromethoxy, 1,1,2,2-tetrafluoroethoxy, NO_2, CN, phenyl, phenoxy, amino, C_1–C_4 alkylamino, diloweralkylamino, chlorophenyl, methylphenyl, phenoxy substituted with one Cl, CF_3, NO_2, or CH_3 group, C_3–C_8 straight or branched alkenyloxy optionally substituted with one to three halogens, or C_3–C_8 straight or branched alkynyloxy optionally substituted with one to three halogens;

the optical isomers thereof when R_1 and R_2 are not the same;

the tautomers thereof; and

the acid addition salts thereof or herbicidal esters and salts thereof comprising reacting an N-(1-cyano-1,1-disubstituted methyl)phthalamic acid, or a 2-[(1-cyano-1,1-disubstituted methyl)carbamoyl]-nicotinic or quinoline-3-carboxylic acid of Formula II



(II)

wherein A, X, Y, Z, R_1, R_2 and R_3 are as described for Formula I, in a chlorinated hydrocarbon saturated with an excess of a hydrogen halide, in a temperature range of 0° C. to 130° C. for from one to 20 hours under anhydrous conditions.

4,709,037

BIOTINYLATING AGENTS

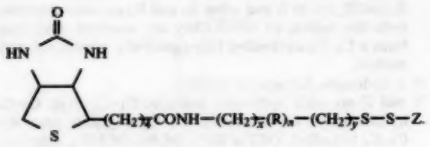
Gerald F. Sigler, San Diego, Calif., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Feb. 17, 1987, Ser. No. 15,324

Int. Cl.[4] C07D *495/04*

U.S. Cl. 546—271 **5 Claims**

1. A compound of the formula:



where x and y are integers of 1 to 5, n is 0 or 1, R is —CONH— or —CN(CO_2H)NHCO— and Z is a pyridyl group optionally substituted with one or more substituents of such type and in such position as to preserve the tautomerism of the thiolthione generated upon cleavage of the —S—S— group.

4,709,038

BIOLOGICALLY ACTIVE AMIDES

Ian T. Kay, Wokingham, and Robert A. Noon, Maidenhead, both of England, assignors to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 408,894, Aug. 17, 1982, Pat. No. 4,515,959. This application Jan. 31, 1985, Ser. No. 696,719

Claims priority, application United Kingdom, Sep. 30, 1981, 8129521

Int. Cl.[4] C07D *213/55, 213/56, 333/38, 307/66*

U.S. Cl. 546—316 **2 Claims**

1. A compound of the formula

wherein R^1 is (a) a phenyl group optionally substituted by one or more halogen atoms, cyano groups, C_1 to C_6 alkoxy groups, methylene- or ethylene-dioxy groups, C_1 to C_6 alkyl groups, or C_1 to C_6 haloalkyl groups or (b) a heteroaromatic group selected from the group consisting of furyl, thiophenyl, and pyridyl optionally substituted by one or more C_1 to C_6 alkyl groups, C_1 to C_6 haloalkyl groups or halogen atoms; X is a halogen or hydroxy; and Y is $CONH_2$ or $COOCH_3$, R^1 being other than unsubstituted phenyl when Y is $COOCH_3$ and X is OH.

4,709,039

VINYLOXAZOLINE MONOMER AND PREPARATION THEREOF

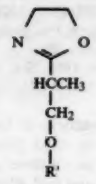
Richard T. Chou, Wilmington, Del., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 21, 1986, Ser. No. 842,686

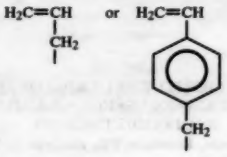
Int. Cl.[4] C07D *211/32*

U.S. Cl. 548—237 **5 Claims**

1. A compound of the formula



wherein R' is selected from the group consisting of:



4,709,040

OXAZOLINE CONTAINING MULTIFUNCTIONAL MONOMER

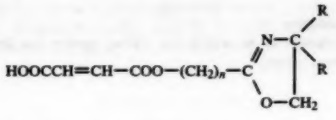
Anil B. Goel, Worthington, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.

Filed Aug. 21, 1986, Ser. No. 899,198

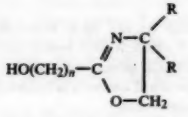
Int. Cl.[4] C07D *263/08, 413/00*

U.S. Cl. 548—237 **4 Claims**

1. The process for preparing a multifunctional monomer of the formula:



by reacting maleic anhydride with a hydroxy alkyl 2-oxazoline of the formula:



wherein R independently represents hydrogen or a hydrocarbon group having from 1 to 20 carbon atoms and n is a number of from 1 to 20.

4,709,041

2-(FORMYLPHENYL) BENZOTRIAZOLE INTERMEDIATES

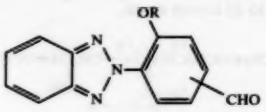
Avinash C. Mehta, Belmont, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 321,588, Nov. 16, 1981, abandoned. This application Aug. 25, 1986, Ser. No. 900,238

Int. Cl.[4] C07D *249/20*

U.S. Cl. 548—260 **10 Claims**

1. A compound of the formula



wherein R is hydrogen or a hydroxy-protecting group capable of removal so as to regenerate the hydroxy group.

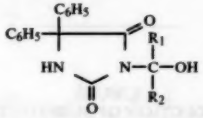
4,709,042

PROCESS FOR THE PREPARATION OF 2-(1-HYDROXYALKYL)-5,5-DIPHENYLHYDANTOIN

Khuong H. X. Mai, Waukegan, and Ghanshyam Patil, Vernon Hills, both of Ill., assignors to E. I. Du Pont de Nemours & Co., (Inc.), Wilmington, Del.

Filed Sep. 19, 1986, Ser. No. 909,140
Int. Cl.[4] C07D *233/72*
U.S. Cl. 548—312 **6 Claims**

1. A process of preparing a 2-(1-hydroxyalkyl)-5-5-diphenylhydantoin of the formula



wherein R_1 and R_2 are each independently hydrogen, C_1–C_6 alkyl, or R_1 and R_2 together with the carbon atom to which they are attached form a 3 to 12 member cycloalkyl group, which process comprises: mixing in a single reaction vessel a selected aldehyde or ketone, an alcohol, a catalytic amount of an inorganic strong base, and phenytoin, respectively, in the named order, to produce the desired 2-(1-hydroxyalkyl)-5,5-diphenylhydantoin.

4,709,043

PROCESS FOR THE PREPARATION OF IMIDAZOLONECARBONYLARYLIMIDAZOLES

Paul W. Erhardt, Long Valley; Alfred A. Hagedorn, III, Edison, both of N.J.; William C. Lumma, Jr., Pennsburg, Pa., and Ronald A. Wohl, Morris Plains, N.J., assignors to Schering A.G., Berlin, Fed. Rep. of Germany

Division of Ser. No. 628,875, Jul. 9, 1984, Pat. No. 4,556,665. This application Nov. 26, 1985, Ser. No. 801,702
Int. Cl.[4] C07D *233/70, 401/14*
U.S. Cl. 548—318 **5 Claims**

1. A process for preparing 4-acyl-1,3-dihydro-2H-imidazol-2-ones which comprises reaction of a carboxylic acid or acid derivative thereof corresponding to the 4-acyl group with a 2,3-dihydro-2-oxo-1H-imidazole-4-carboxylic acid or a tertiary alkyl ester thereof in the presence of an acidic catalyst in the temperature range of from about 0° C. to about 180° C.

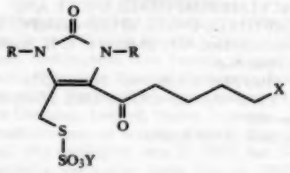
4,709,044

BIOTIN INTERMEDIATES

Constantine Sklavounos, Waterford, Conn., assignor to Pfizer Inc., New York, N.Y.

PCT No. PCT/US84/01563, § 371 Date May 23, 1986, § 102(e) Date May 23, 1986, PCT Pub. No. WO86/02069, PCT Pub. Date Apr. 10, 1986
PCT Filed Sep. 26, 1984, Ser. No. 879,231
Int. Cl.[4] C07D *233/38*
U.S. Cl. 548—321 **5 Claims**

1. A compound of the formula



wherein R is (C_1–C_5)alkanoyl or (C_2–C_5)alkoxycarbonyl, X is methyl or (C_2–C_5)alkoxycarbonyl and Y is an alkali metal, with the proviso that when R is acetyl, X is other than ethoxycarbonyl.

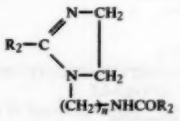
4,709,045

PROCESS FOR PRODUCING 1,2-SUBSTITUTED IMIDAZOLINE COMPOUNDS

Makoto Kubo, Wakayama; Koshiro Sotoya, and Kazuhiko Okabe, both of Naga, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Jun. 6, 1986, Ser. No. 871,651
Claims priority, application Japan, Jun. 19, 1985, 60-133294
Int. Cl.[4] C07D *233/04*
U.S. Cl. 548—352 **3 Claims**

1. A process for producing a 1,2-substituted imidazoline compound having the formula (I):



(I)

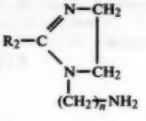
in which R_2 is alkyl or alkenyl having 8 to 22 carbon atoms and n is 2 or 3, which comprises (1) feeding into a reactor a dialkylenetriamine having the formula (II):

$$H_2N—CH_2CH_2—NH—(—CH_2—)_nNH_2 \quad \text{(II)}$$

in which n is the same as defined above, and a higher fatty acid having the formula (III) or an ester thereof:

$$R_2COOH \quad \text{(III)}$$

in which R_2 is the same as defined above, at a molar ratio of the compound (III) to the compound (II) in the range of 1.5:1 to 1.8:1, (2) effecting the reaction at an internal temperature of 100° to 250° C. at a reduced pressure until the reaction mixture consists essentially of a mixture of the compound (I) and the compound



wherein R_2 and n have the same meanings as defined above, (3) then adding an additional amount of the compound (III) or ester thereof to the reaction mixture so that the molar ratio of III:II, based on the total amounts of III and II added to the reactor, is at least 2.0:1 and (4) continuing the reaction at an internal temperature of 100° to 250° C. at a reduced pressure until the reaction mixture consists essentially of compound I substantially free of primary and secondary amines.

4,709,046

ACYLMERCAPTOALKANOYL AND MERCAPTOALKANOYL SPIRO COMPOUNDS

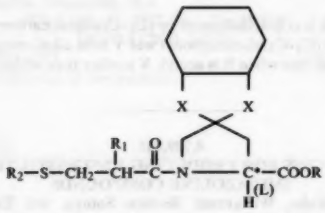
John Krapcho, Somerset, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 9, 1983, Ser. No. 492,524

Int. Cl.[4] C07D *491/113, 495/10;* **A61K** *31/40, 31/44*

U.S. Cl. 548—409 **13 Claims**

1. A compound of the formula



and a pharmaceutically acceptable salt thereof wherein:

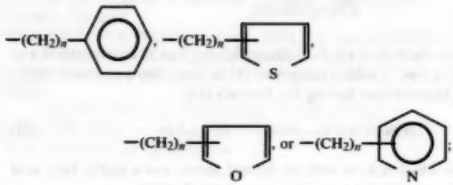
X is oxygen or sulfur;

R is hydrogen, lower alkyl, or a pharmaceutically acceptable salt forming ion;

R_1 is hydrogen, lower alkyl, or trifluoromethyl;

R_2 is hydrogen or

R_3 is lower alkyl,



and n is zero or an integer from 1 to 4.

4,709,047

SUBSTITUTED UNSATURATED, SULFONYLOXY GROUP-CONTAINING BICYCLIC IMIDES AS CATALYSTS FOR CATIONIC POLYMERIZATION

Alfred Renner, Muntelier, and Christian Vonlanthen, Lentigny, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

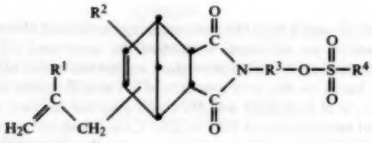
Filed Jan. 17, 1986, Ser. No. 819,656

Claims priority, application Switzerland, Jan. 29, 1985, 388/85

Int. Cl.[4] C07D *209/94*

U.S. Cl. 548—435 **9 Claims**

1. An imide of formula I



(I)

wherein each of R^1 and R^2 independently of the other is hydrogen or methyl, R^3 is a direct bond, a straight or branched chain alkylene of 2 to 20 carbon atoms,

where m is 1 to 8, cycloalkylene of 5 to 8 carbon atoms, bi-(cyclohexylene)methane, 2,2-bis-(cyclohexylene)-propane, decahydronaphthylene, phenylene, naphthylene, said phenylene or said naphthylene substituted by one or more C_1–C_4-alkyl groups, or a group of the formula II

(II)

wherein T is methylene, isopropylidene, CO, O, S or SO_2, and R^4 is C_1–C_{12}alkyl, C_5–C_8cycloalkyl, C_6–C_{10} aryl, benzyl or C_7–C_{12}-alkaryl.

4,709,048

PRODUCTION OF SUBSTITUTED 2,3,4,9-TETRAHYDRO-1H-CARBAZOLE-1-ACETIC ACID DERIVATIVES

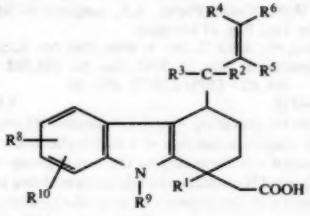
Dominick Mobilio, Franklin Park; Christopher A. Demerson, Plainsboro, and Leslie G. Humber, North Brunswick, all of N.J., assignors to American Home Products Corp., New York, N.Y.

Continuation-in-part of Ser. No. 830,598, Feb. 18, 1986, abandoned, which is a division of Ser. No. 797,561, Nov. 13, 1985, Pat. No. 4,616,028, which is a continuation-in-part of Ser. No. 726,197, Apr. 22, 1985, abandoned. This application Mar. 31, 1987, Ser. No. 32,835

Int. Cl.[4] C07D *209/86*

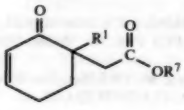
U.S. Cl. 548—439 **4 Claims**

1. Process for the production of the compound of structure (I)



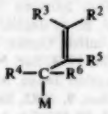
(I)

wherein R^1 is lower alkyl; R^2, R^3, R^4, R^5, and R^6 are hydrogen or lower alkyl; R^8 and R^{10} are independently hydrogen, lower alkyl, or halogen; R^9 is hydrogen or lower alkyl, which comprises reacting the compound of structure (IV)

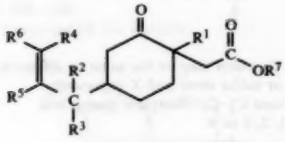


(IV)

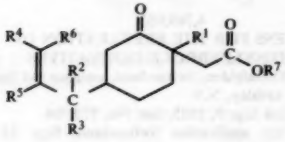
wherein R^1 is as defined above and R^7 is lower alkyl with



wherein R^2, R^3, R^4, R^5, and R^6 are as defined above and M is $SiR^{11}R^{12}R^{13}$ or $SnR^{11}R^{12}R^{13}$ wherein R^{11}, R^{11}, and R^{13} are independently selected from the group consisting of hydrogen, straight chain or branched lower alkyl containing 1 to 6 carbon atoms, cycloalkyl, aryl, arylalkyl, halogen, and alkoxy, with the reaction being carried out in the presence of an acid to obtain a compound or compounds of structure Va, or Vb

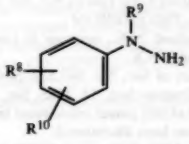


(Va)



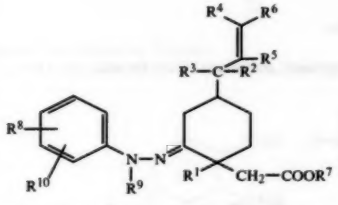
(Vb)

wherein R^1, R^2, R^3, R^4, R^5, R^6, and R^7 are as defined above and further reacting a compound of structure (Va) or (Vb) with the substituted hydrazine of structure (VI)



(VI)

wherein R^8 and R^{10} are independently hydrogen, lower alkyl, or halogen; and R^9 is hydrogen or lower alkyl to obtain the corresponding hydrazone of structure (VII)



(VII)

wherein R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, and R^{10} are as defined above and treating the hydrazone with a cyclizing agent to give the ester of compound (I); and further hydrolyzing said ester to obtain the compound (I).

4,709,049

2-SUBSTITUTED PHENYL-4,5,6,7,-TETRAHYDRO-2H-INDOLE-1,3,-DIONES, AND THEIR PRODUCTION AND USE

Eiki Nagano, Nishinomiya; Ryo Yoshida, Kawanishi; Hiroshi Matsumoto, Kakogawa; Shunichi Hashimoto, Kobe, and Katsuzo Kamoshita, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation-in-part of Ser. No. 609,019, May 10, 1984, abandoned. This application Jun. 17, 1985, Ser. No. 744,943

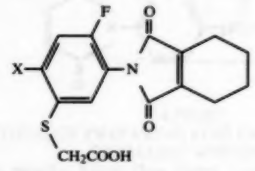
Claims priority, application Japan, May 16, 1983, 58-86213

The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.[4] C07D *209/48*

U.S. Cl. 548—513 **3 Claims**

1. A 2-(2-fluoro-4-halo-5-carboxymethylthiophenyl)4,5,6,7-tetrahydro-2H-isoindole-1,3-dione of the formula:



wherein X is a chlorine atom or a bromine atom.

4,709,050

SUBSTITUTED-(HYDROXYPHENYL)-PYRROLIDINE-2,5-DIONE STABILIZERS

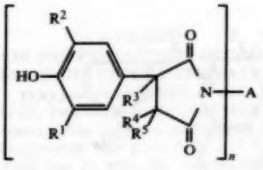
John D. Spivack, Spring Valley, and Stephen D. Pastor, Yonkers, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 15, 1985, Ser. No. 798,660

Int. Cl.[4] C07D *207/12, 207/24*

U.S. Cl. 548—520 **8 Claims**

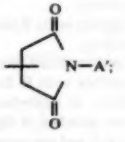
1. A compound of the formula



wherein

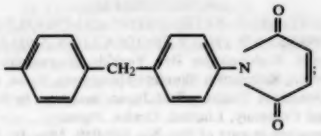
R^1 and R^2 independently are alkyl of 1 to 12 carbon atoms, cycloalkyl of 5 to 6 carbon atoms, phenyl or phenyl substituted by alkyl of 1 to 12 carbon atoms;

R^3, R^4 and R^5 are hydrogen and one of R^3, R^4 and R^5 is



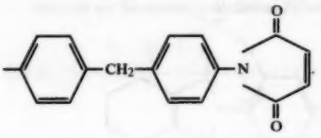
in is 1 or 2;

A, when n is 1, is alkyl of 1 to 30 carbon atoms, phenyl, cycloalkyl of 5 to 6 carbon atoms or



A, when n is 2, is alkylene of 1 to 10 carbon atoms, phenylene, cycloalkylene of 5 to 6 carbon atoms or diphenylene (C_1–C_3)alkylene; and

A′ is alkyl of 1 to 30 carbon atoms, phenyl, cycloalkyl of 5 to 6 carbon atoms or



4,709,051

NOVEL AROYLPYRROLES, THEIR PRODUCTION AND THEIR USE IN IMMUNOLOGIC THERAPY

Jean-Pierre Labaune, Moulignon-Ponthierry, and Pierre B. Essin, Chilly-Mazarin, both of France, assignors to Albert Rolland, S.A., Paris, France

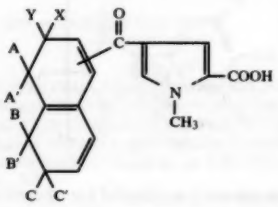
Filed Mar. 24, 1986, Ser. No. 842,899

Int. Cl.[4] C07C *207/323*

U.S. Cl. 548—533 **7 Claims**

1. The naphthoyl derivatives of pyrrolyl-carboxylic acid selected from the group consisting of:

(a) an acid derivative of the formula



(I)

wherein:

X is hydrogen, hydroxy or methylsulphinyl

Y is hydrogen, or together with A′ forms a double bond;

A is hydrogen, or hydroxy;

A′ is hydrogen or together with Y forms a double bond;

B is hydrogen or hydroxy;

B′ is hydrogen or together with C forms a double bond;

C is hydrogen, or together with B′ forms a double bond;

C′ is hydrogen, hydroxy or methylsulphinyl with the proviso that at least one member of the group X, A, B, and C′ is other than hydrogen and one member only of the group X, and C′ is methylsulfinyl or hydroxy; and

(b) the base addition of salts thereof with a therapeutically compatible mineral or organic base.

4,709,052

SOIL DISEASE-CONTROLLING IMIDES

Hiroki Tomioka, Takarazuka; Tadashi Ooishi, Toyonaka; Junya Takahashi, Nishinomiya; Mitsuru Sasaki, Toyonaka, and Naonori Hirata, Sakai, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

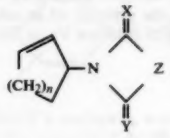
Filed May 16, 1984, Ser. No. 610,789

Claims priority, application Japan, May 31, 1983, 58-97545; Jun. 3, 1983, 58-99959; Jun. 9, 1983, 58-103949; Jun. 13, 1983, 58-106233; Aug. 17, 1983, 58-150853; Aug. 18, 1983, 58-151117

Int. Cl.[4] C07D *207/456*

U.S. Cl. 548—548 **2 Claims**

1. A 2-cycloalkenylamine derivative represented by the formula,



wherein X and Y, which may be the same or different, represent an oxygen or sulfur atom and Z represents:

a halo substituted C_2–C_3 alkenylene group and

n represents 1, 2, 3 or 4.

4,709,053

PROCESS FOR THE PREPARATION OF 4-PHENYLPYRROLE DERIVATIVES

Pierre Martin, Rheinfelden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sep. 9, 1985, Ser. No. 773,706

Claims priority, application Switzerland, Sep. 12, 1984, 4355/84

Int. Cl.[4] C07D *207/333*

U.S. Cl. 548—561 **1 Claim**

1. 3-Hydroxyiminomethyl-4-(2,3-dichlorophenyl)pyrrole.

4,709,054

SILYLATION METHOD AND ORGANIC SILANES MADE THEREFROM

Jonathan D. Rich, Rexford, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 647,332, Sep. 4, 1984, abandoned. This application Aug. 13, 1985, Ser. No. 765,089

The portion of the term of this patent subsequent to Aug. 5, 2003, has been disclaimed.

Int. Cl.[4] C07F *7/08, 7/10, 7/18*; C07D *307/77*

U.S. Cl. 549—214 **30 Claims**

1. A method for making organic silanes which comprises

(A) effecting reaction between aromatic acyl halide of the formula

and halogenated polysilane of the formula

in the presence of an effective amount of a transition metal catalyst, and

(B) thereafter recovering organic silane from the resulting mixture of (A),

where X is a halogen radical, R is selected from X, hydrogen,

$C_{(1-13)}$ monovalent hydrocarbon radicals, substituted $C_{(1-13)}$ monovalent hydrocarbon radicals and divalent —O—, —S— radicals and mixtures thereof, which can form ≡SiOSi≡ and ≡SiSSi≡ connecting groups, R^1 is a $C_{(6-20)}$ monovalent or polyvalent aromatic organic radical, n is an integer equal to 1 to 50 inclusive, and m is an integer equal to 1 to 4 inclusive.

4,709,055

(ALKOXY-METHYL)-PHENYL-METHYL-EPOXYBUTANES

Richard Barner, Witterswil, and Josef Hübscher, Seon, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 619,654, Jun. 11, 1984, Pat. No. 4,582,919. This application Jan. 13, 1986, Ser. No. 818,451

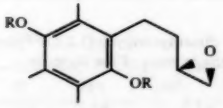
Claims priority, application Switzerland, Jun. 21, 1983, 3391/83

Int. Cl.[4] C07D *309/12*

U.S. Cl. 549—215 **3 Claims**

1. A compound of the formula

III



wherein R is a hydrolytically or oxidatively cleavable ether protecting group.

4,709,056

4,4-DIHALOHEXAHYDROPHTHALIC ANHYDRIDES AND 4-FLUOROTETRAHYDROPHTHALIC ANHYDRIDE, AND PROCESS FOR THEIR PREPARATION

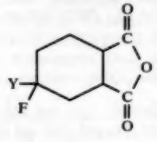
Byron R. Cotter, Northvale, N.J.; Henry C. Lin, Grand Island, and Joseph A. Pawlak, Cheektowaga, both of N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 493856, May 12, 1983, abandoned. This application May 2, 1984, Ser. No. 604,271

Int. Cl.[4] C07C *61/09*; C07D *307/89*

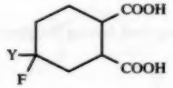
U.S. Cl. 549—246 **18 Claims**

1. A 4,4-dihalotetrahydrophthalic anhydride of the formula



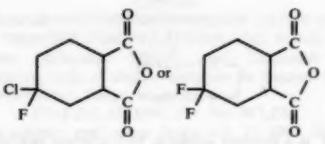
where Y is chlorine or fluorine.

4. A 4,4-dihalocyclohexanedicarboxylic acid of the formula

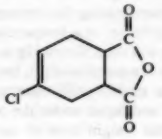


where Y is chlorine or fluorine.

7. A process for the preparation of 4,4-dihalohexahydrophthalic anhydrides of the formula



which comprises reacting hydrogen fluoride with 4-chlorotetrahydrophthalic anhydride of the formula



4,709,057

METHOD OF PREPARING FINE CRYSTAL PARTICLES OF MALEIC ANHYDRIDE

Seizi Sumida; Kaichi Ono; Kazuo Yoshida, all of Oita, and Tomozo Yamada, Tokyo, all of Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

Filed Sep. 3, 1986, Ser. No. 903,230

Claims priority, application Japan, Sep. 10, 1985, 60-198538; Japan, Sep. 28, 1985, 60-213649

Int. Cl.[4] C07D *307/60*

U.S. Cl. 549—262 **6 Claims**

1. A method of preparing fine crystal particles of maleic anhydride, which comprises the steps of putting a molten mass of purified maleic anhydride into a hermetically closed container moved at a moving rate of 1 to 30 times per minute, and slowly cooling said molten mass of maleic anhydride to room temperature over a period of not less than 3 hours while keeping under the moving condition separated fine crystals of maleic anhydride having a particle size which passes through a sieve of 10 mesh.

4,709,058

PROCESS FOR THE PRODUCTION OF MACROCYCLIC ESTERS BY THE DEPOLYMERIZATION OF POLYESTERS

Joseph Cahill, Jr., Fort Mitchell, Ky., and Herbert G. Rodenberg, Cincinnati, Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

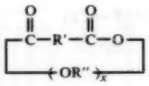
Filed Sep. 19, 1986, Ser. No. 909,760

Int. Cl.[4] C07D *323/00, 313/00, 327/00, 327/02*

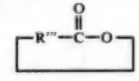
U.S. Cl. 549—267 **14 Claims**

1. An improved thermal depolymerization process for the production of macrocyclic esters having from 8 to 20 carbon atoms of the formula

(I)

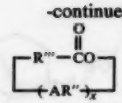


(II)



or

-continued



(III)

where R′ is a bivalent aliphatic hydrocarbon radical having from 1 to 16 carbons, R″ is a saturated bivalent aliphatic hydrocarbon radical having from 2 to 12 carbon atoms, R‴ is a bivalent aliphatic hydrocarbon radical having from 6 to 18 carbon atoms, x is an integer from 1 to 4, and A is oxygen or sulfur, which comprises heating the corresponding linear polyester and an olefin polymer at a temperature from 200° C. to 400° C. and pressure less than 50 mm Hg in the pressure of 0.01 to 10 weight percent of a metal catalyst, based on the polyester, while removing the macrocyclic ester product, said olefin polymer being inert and liquid under the operating conditions of the process and the weight ratio of said olefin polymer to polyester ranging from 100:1 to 1:20.

4,709,059

PROCESS FOR SELECTIVE HALOGENATION OF PRIMARY HYDROXYL GROUPS

Stoil K. Dirlikov, and Connie J. Schneider, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 12, 1985, Ser. No. 764,287
Int. Cl.[4] C07D *317/16*; C07C *31/18*
U.S. Cl. 549—453 **15 Claims**

1. A process for selective halogenation of terminal carbon atoms bearing primary pendant hydroxyl groups in a polyol having a straight carbon chain wherein each carbon in said chain is bonded to an oxygen; said process comprising contacting said polyol with (a) a functionally effective amount of an organic halogenating agent which is a chlorinating agent or brominating agent and (b) a complex enabling amount of a scavenger agent which is able to form a complex with the remaining portion of unused halogenating agent under conditions sufficient to selectively replace the primary pendant hydroxyl groups of the polyol with halogens.

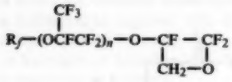
4,709,060

SUBSTITUTED TRIFLUOROOXETANES

Yohnosuke Ohsaka, Ibaraki, and Shoji Takaki, Toyonaka, both of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

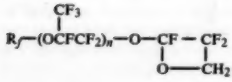
Continuation-in-part of Ser. No. 691,894, Jan. 16, 1985, abandoned. This application Jul. 11, 1986, Ser. No. 884,507
Claims priority, application Japan, Jan. 20, 1984, 59-8768
Int. Cl.[4] C07D *305/08*
U.S. Cl. 549—511 **4 Claims**

1. A substituted trifluorooxetane of the formula:



(I)

or



(II)

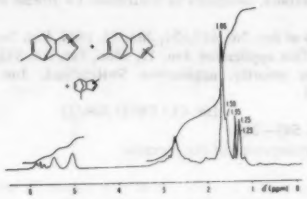
wherein R_f is a C_1–C_{10} perfluoroalkyl group and n is 0, 1 or 2.

4,709,061

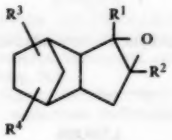
MIXTURES OF DIMETHYL-TRICYCLO (5.2.1.02,6) DECANE DERIVATIVES TOGETHER WITH THEIR PREPARATION AND USE AS A SCENT-AND FLAVOR MATERIALS

Ernst-Joachim Brunke, and Hartmut Struwe, both of Holzminden, Fed. Rep. of Germany, assignors to DRAGOCO Gerberding & Co. GmbH, Holzminden, Fed. Rep. of Germany

Continuation of Ser. No. 550,947, Nov. 14, 1983, abandoned. This application Sep. 19, 1986, Ser. No. 909,514
Claims priority, application Fed. Rep. of Germany, Nov. 13, 1982, 3242042
Int. Cl.[4] C07D *303/06*
U.S. Cl. 549—544 **2 Claims**



1. Mixtures of dimethyl-tricyclo[5.2.1.$0^{2,6}$]decane derivatives which comprise isomers of the formula



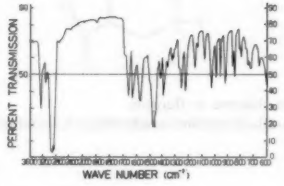
wherein R^1 and R^2 are either methyl or hydrogen with the proviso that R^1 and R^2 must be different; R^3 and R^4 are either methyl or hydrogen with the proviso that they must be different.

4,709,062

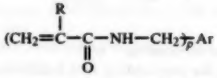
GLYCIDYL COMPOUND

Haruo Tomita, Kobe; Yasuo Okamoto, Okayama, and Kazuya Yonezawa, Kobe, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 681,249, Dec. 13, 1984, abandoned. This application Jan. 28, 1986, Ser. No. 823,410
Claims priority, application Japan, Dec. 15, 1983, 58-237493
Int. Cl.[4] C07D *303/46*
U.S. Cl. 549—553 **2 Claims**

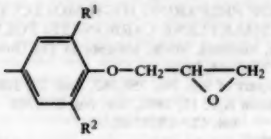


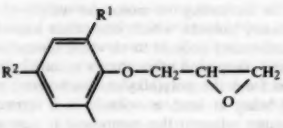
1. A glycidyl compound having the formula (I):



(I)

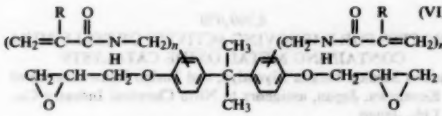
wherein R is hydrogen atom or methyl group, p is an integer of 1 and Ar is an aromatic hydrocarbon group selected from the group consisting of groups having the formulae (II) and (III):


(II)


(III)

wherein R^1 and R^2 are the same or different and each is an alkyl group having 1 to 4 carbon atoms.

2. Glycidyl compounds having the formula (VII):


(VII)

wherein R is hydrogen atom or methyl group, n and n' are 0, 1 or 2 and at least one of n and n' is not 0, said compounds (VII) being prepared by condensing bisphenol A with an N-methylol arylamide compound in the presence of an acid, adding an epihalohydrin to the condensate in the presence of a phase transfer catalyst, and dehydrohalogenating the addition product with an alkali.

4,709,063

PREPARATION OF 2-HALO-5-METHYLPYRIDINES FROM 4-METHYL-4-PENTENE DERIVATIVES

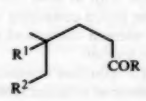
Richard V. Nelson, Wilmington, Del., and John F. Stephen, West Chester, Pa., assignors to ICI Americas Inc., Wilmington, Del.

Division of Ser. No. 684,149, Dec. 20, 1984, Pat. No. 4,628,096, which is a division of Ser. No. 496,680, May 20, 1983, Pat. No. 4,504,664. This application Aug. 8, 1986, Ser. No. 894,615

Int. Cl.[4] C07D *303/40*

U.S. Cl. 549—561 **1 Claim**

1. A pentane derivative of the following formula



wherein

R is a C_{1-6} alkoxy group; and

R^1 and R^2 are joined together to form an oxirane ring.

4,709,064

β-N-SUBSTITUTED AMINOTHIOL ESTER AND PROCESS FOR PREPARING THE SAME

Masakatsu Shibasaki, Mitaka, and Takamasa Iimori, Sagamihara, both of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

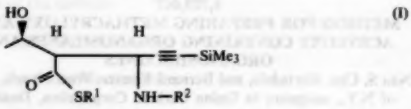
Filed Jul. 23, 1986, Ser. No. 887,296

Claims priority, application Japan, Jul. 24, 1985, 60-162144; Jul. 24, 1985, 60-162145

Int. Cl.[4] C07F *7/10*

U.S. Cl. 556—418 **2 Claims**

1. β-N-Substituted aminothiol ester represented by the general formula (I):


(I)

wherein R^1 is an alkyl group or an aryl group and R^2 is an aralkyl group.

4,709,065

ORGANOSILICON COMPOUND HAVING POLYSULFIDE LINKAGES AND A RUBBER COMPOSITION COMPRISING THE SAME

Hiroshi Yoshioka; Ichiro Ono, both of Annaka, and Hitoshi Uehara, Matsuida, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Sep. 19, 1986, Ser. No. 909,783

Claims priority, application Japan, Sep. 20, 1985, 60-208292

Int. Cl.[4] C07F *7/08, 7/18*

U.S. Cl. 556—428 **7 Claims**

1. An organosilicon compound having two polysulfide linkages in a molecule represented by the general formula

$$(R^1O)_3Si—R^2—S_x—R^3—S_x—R^2—Si(OR^1)_3,$$

in which R^1 is an alkyl group having from 1 to 4 carbon atoms, R^2 is a divalent hydrocarbon group having from 1 to 10 carbon atoms, R^3 is a divalent hydrocarbon group having from 2 to 10 carbon atoms or a divalent hydrocarbon group additionally containing one or more of the linking units of the formula —O— or —CO—O— in the structure and x is a positive integer of from 2 to 6.

4,709,066

ACRYLIC SILICATE COMPOSITIONS AND METHODS AND HIGHLY OXYGEN-PERMEABLE POLYACRYLATES MADE THEREFROM

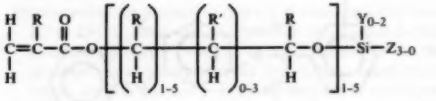
Dwain R. Chapman, Adrian, Mich., assignor to Fused Kontacts of Chicago, Chicago, Ill.

Filed Jul. 15, 1985, Ser. No. 754,590

Int. Cl.[4] C07F *7/04, 7/08*

U.S. Cl. 556—437 **7 Claims**

1. As a new composition of matter, an acrylic silicate of the type having the general formula:

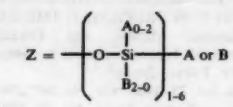


wherein

R=alkyl, aryl or H,

R'=R or OR

Y=alkyl, vinyl, aryl, or fluoroalkyl



A=Y or H; and

B=oxyalkyl, oxyaryl, oxyfluoroalkyl, oxyalkylacrylate, alkyl esters, aryl esters, fluoroalkyl esters, or acrylic esters.

4,709,067

METHOD FOR PREPARING METHACRYLOXY AND ACRYLOXY CONTAINING ORGANOSILANES AND ORGANOSILICONES

Nan S. Chu, Hartsdale, and Bernard Kanner, West Nyack, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed May 20, 1986, Ser. No. 865,009

Int. Cl.[4] C07F *7/18, 7/08*

U.S. Cl. 556—440 **71 Claims**

1. A process for preparing methacryloxy or acryloxy containing organosilicon compounds without undesirable polymerization which process comprises:

(a) charging a first reservoir with

(i) 2–10% molar excess of a methacryloxy or acryloxy functional containing compound over a stochiometric amount of alkoxysilane or Si—H containing silicone which would be needed to form a complete reaction between said functional containing compound and said organosilane or silicone; and

(ii) 0.2 to 5.0% of an inhibitor by weight based on the amount of methacryloxy or acryloxy used;

(b) charging a second reservoir with

(i) a stochiometric amount of alkoxysilane or Si—H containing silicone needed to form a complete reaction with the methacryloxy or acryloxy containing compound employed in (a); and

(ii) a catalytic amount of platinum-containing hydrosilation catalyst;

(c) combining the contents of the two reservoirs in a reactor vessel at 80°–120° centigrade.

(d) post treating the crude reaction product with 1–5% alcohol by weight based on weight of product or post heating the reaction product for 5–40 minutes at 100°–140° C.; and

(e) vacuum distilling the post-treated product in the presence of inhibitors and under reduced pressure.

4,709,068

SUBSTITUTED PHENYLTRIALKYLSILANE INSECTICIDES

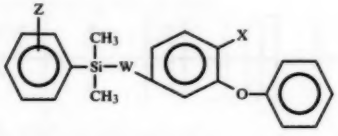
Scott M. Sieburth, Princeton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Jun. 2, 1986, Ser. No. 869,797

Int. Cl.[4] C07F *7/08, 7/18*

U.S. Cl. 556—447 **10 Claims**

1. A compound of the formula



wherein Y is alkyl, alkoxy, halogen, or haloalkoxy, Z is hydrogen, halogen, alkyl, alkoxy, or haloalkoxy, or Y and Z together form the group —A—$(CR_1R_2)_n$—A— where R_1 and R_2 are independently hydrogen, halogen, or alkyl, n=1 or 2, and each A may be O, S, or CH_2; W is a —$CH_2CH_2CH_2$— group; and X is fluorine or hydrogen.

4,709,069

METHOD OF PREPARING HIGH MOLECULAR WEIGHT POLY(ALKYLENE CARBONATE) POLYAHLS

Robert F. Harris, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 750,362, Jun. 27, 1985. This application Apr. 11, 1986, Ser. No. 850,788

Int. Cl.[4] C07C *68/06*

U.S. Cl. 558—265 **18 Claims**

1. A process for increasing the molecular weight of a poly(alkylene carbonate) polyahl which comprises exposing the poly(alkylene carbonate) polyahl to elevated temperatures at which at least one compound other than a monoalkylene glycol is abstracted from the poly(alkylene carbonate) polyahl, said compound being at least as volatile as a tetraethylene glycol at a pressure wherein the compound is gaseous, and removing the gaseous compound from the mass of the poly(alkylene carbonate) polyahl, under conditions such that the molecular weight of the poly(alkylene carbonate) polyahl is increased.

4,709,070

PROCESS FOR IMPROVING ACTIVITY OF TELLURIUM CONTAINING METAL OXIDE CATALYSTS

Yutaka Sasaki; Yutaka Kiyomiya, and Toshio Nakamura, all of Kanagawa, Japan, assignors to Nitto Chemical Industry Co., Ltd., Japan

Division of Ser. No. 379,205, May 17, 1982, Pat. No. 4,618,593. This application Nov. 9, 1984, Ser. No. 669,978

Claims priority, application Japan, May 15, 1981, 56-73144; Feb. 15, 1982, 57-21095

Int. Cl.[4] C07C *120/00, 120/14, 120/32*

U.S. Cl. 558—322 **7 Claims**

1. In the process for the ammoxidation reaction of organic compounds at a temperature of about 300° C. to about 600° C. in a fluidized bed reactor using a tellurium-containing metal oxide catalyst having a composition, as defined in a freshly prepared state, represented by an empirical formula (A),

$$A_aTe_bC_cD_dE_eO_x \quad (A)$$

wherein A represents at least one element selected from the group consisting of Sb, Mo and V, Te represents tellurium, C represents at least one element selected from the group consisting of B, P, As, Bi, S and Se, D represents at least one element selected from the group consisting of Li, Na, K, Rb, Cs and Tl, E represents at least one element selected from the group consisting of Mg, Ca, Sr, Ba, Y, La, Ce, U, Ti, Zr, Nb, Ta, Cr, W, Mn, Re, Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Zn, Cd, Al, Ga, In, Ge, Sn and Pb, and O represents Oxygen; and a, b, c, d, e and x each represents the atomic ratio of the elements in the formula for which they are subscripts, wherein a=10, b=0.01 to 5, c=0 to 10, d=0 to 5, e=0 to 60 and x is the number of oxygen corresponding to the oxides formed by combining the above described components, said catalyst has become partially deactivated during the reaction, the process comprising regenerating the deactivated catalyst at the reaction temperature by contacting the deactivated catalyst while conducting the reaction with at least one activity improving agent selected from the group consisting of:

(i) a tellurium-molybdenum compound unsupported or supported on an inert carrier;

(ii) a dry mixture of a tellurium compound and a molybdenum containing material selected from the group consisting of a molybdenum compound, a molybdenum enriched metal oxide catalyst and a molybdenum compound supported on an inert carrier;

(iii) a dry mixture of a tellurium enriched metal oxide cata-

lyst and a molybdenum compound unsupported or supported on an inert carrier; and

(iv) a dry mixture of a tellurium compound supported on an inert carrier and a molybdenum containing material selected from the group consisting of a molybdenum compound, a molybdenum enriched metal oxide catalyst and a molybdenum compound supported on an inert carrier,

wherein said tellurium compound is substantially free of molybdenum and said molybdenum compound is substantially free of tellurium, wherein said tellurium-molybdenum compound contains both tellurium and molybdenum in compound form and wherein said tellurium enriched metal oxide catalyst comprises a metal oxide catalyst having the empirical formula as catalyst (A) above and the content of tellurium in the enriched metal oxide catalyst is increased by at least about 1% by weight based on the content of tellurium in the freshly produced catalyst of the empirical formula (A) above and the molybdenum enriched metal oxide catalyst has the same empirical formula as the catalyst (A) above and the content of molybdenum in the enriched metal oxide catalyst is increased by at lest about 0.5% by weight based on the content of molybdenum in the freshly produced catalyst of the empirical formula (A) above.

4,709,071

PROCESS FOR IMPROVING ACTIVITY OF TELLURIUM CONTAINING METAL OXIDE CATALYSTS

Yutaka Sasaki; Yutaka Kiyomiya, and Toshio Nakamura, all of Kanagawa, Japan, assignors to Nitto Chemical Industry Co., Ltd., Japan

Division of Ser. No. 379,205, May 17, 1982, Pat. No. 4,618,593. This application May 21, 1986, Ser. No. 847,074

Claims priority, application Japan, May 15, 1981, 56-73144; Feb. 15, 1982, 57-21095

Int. Cl.[4] C07C *120/14, 120/00*

U.S. Cl. 558—322 **17 Claims**

1. In the process for the production of nitriles by the ammoxidation reaction of hydrocarbons or alcohols at a temperature of about 300° C. to about 600° C. in a fluidized-bed reactor using a tellurium-containing metal oxide catalyst (A) having a composition, as defined in a freshly prepared state, represented by an empirical formula,

$$Sb_{a1}Mo_{a2}V_{a3}Te_bC_cD_dE_eO_x$$

wherein Te represents tellurium, C represents at least one element selected from the group consisting of B, P, As, Bi, S and Se, D represents at least one element selected from the group consisting of Li, Na, K, Rb, Cs and Tl, E represents at least one element selected from the group consisting of Mg, Ca, Sr, Ba, Y, La, Ce, U, Ti, Zr, Nb, Ta, Cr, W, Mn, Re, Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Zn, Cd, Al, Ga, In, Ge, Sn and Pb, and O represents Oxygen; and a, b, c, d, e and x represent the atomic ratios of the elements in the formula for which they are subscripts, where $a_1+a_2+a_3=10$, $0<a_1+a_2\leqq 10$ and $0\leqq a_3<10$, b=0.01 to 5, c=0 to 10, d=0 to 5, e=0 to 60 and x is the number of oxygen corresponding to the oxides formed by combining the above described components, said catalyst has become partially deactivated during the reaction, the process comprising regenerating the deactivated catalyst at the reaction temperature by contacting the deactivated catalyst with an activity improving agent comprising elemental tellurium while conducting the reaction.

4,709,072

JOINT PREPARATION OF ETHYLENE CYANOHYDRIN AND ITS ETHERS

Franz Merger, Frankenthal; Hans-Martin Hutmacher, Ludwigshafen; Peter Hettinger, Edingen-Neckarhausen; Dieter Voges, Mannheim, and Wolfgang Lengsfeld, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 11, 1986, Ser. No. 872,967

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1985, 3522906

Int. Cl.[4] C07C *121/34, 121/46, 121/75*

U.S. Cl. 558—450 **6 Claims**

1. A process for the joint preparation of ethylene cyanohydrin of the formula

$$HO—CH_2—CH_2—CN$$

and its ether of the formula

$$R—O—Ch_2—Ch_2—CN$$

wherein R has the meaning given below, which comprises:

reacting at 40° to 140° C. and in the presence of a base

(A) an alcohol R—OH (II) where R denotes the residue of a saturated or unsaturated hydrocarbyl aliphatic alcohol of from 1 to 6 carbon atoms and the same substituted with a halogen, hydroxy, C_1–C_4-alkoxy or nitro group, or an alcohol R—OH (II) selected from the group consisting of cyclohexanol, benzyl alcohol, cinnamyl alcohol, phenol, cresol or naphthol, with

(B) the reaction mixture which is obtained by the reaction of acrylonitrile and water in the presence of a base and which contains 2,2′-dicyanodiethyl ether of the formula

$$NC—CH_2—CH_2—O—CH_2—CH_2—CN \quad (III),$$

as the reaction product, the total amount of base for the reaction of (A) with (B) being 0.1 to 50 meq per mole of the ether (III) and said alcohol R-Ho (II) being used in an amount of 0.5 to 5 moles per mole of the ether (III).

4,709,073

PROCESS FOR THE PREPARATION OF URETHANES

John H. Grate, and David R. Hamm, both of Mountain View, Calif., assignors to Catalytica Associates, Mountain View, Calif. and Haldor Topsoe, Copenhagen, Denmark

Filed Jun. 17, 1985, Ser. No. 744,951

The portion of the term of this patent subsequent to Jul. 15, 2003, has been disclaimed.

Int. Cl.[4] C07C *125/065, 125/073*

U.S. Cl. 560—24 **45 Claims**

1. A process for converting a nitrogen-containing organic compound, selected from the group consisting of nitro, nitroso, azo, and azoxy compounds, into the corresponding urethane, by reacting a solution, comprising said nitrogen-containing organic compound and a hydroxyl-containing organic compound, with carbon monoxide, which comprises the steps of:

(a) providing from 0.1 to 100 moles per gm-atom of notrogen in said nitrogen-containing compound of a primary amine in said solution,

(b) contacting the solution of step (a), at temperature of from 80° to 230° C., with carbon monoxide, at an initial carbon monoxide pressure from 10 to 1,000 kg/cm^{2}G. in the presence of a catalyst essentially free of redox active metal halide components and comprising rhodium at conditions sufficient to convert said nitrogen-containing organic compound into the said corrsponding urethane and,

(c) recovering a primary amine in an amount equal to or greater than the amount of primary amine provided to the solution of step (a).

4,709,074

URETHANES CONTAINING PERFLUOROALKYL AND EPICHLOROHYDRIN GROUPS

Heinrich Batheit, Altötting; Winfried Ehrl, Neuötting; Frank Wehowsky, Burgkirchen; Rolf Kleber, Neu-Isenburg; Werner Lotz, Niedernhausen; Wolfgang Glenz, Kelkheim; Hubert Herdt, Langen; Lothar Jäckel, Flörsheim am Main; Jan-Hilbert Mast, Hünfelden; Karl Hintermeier, Frankfurt am Main, and Manfred Müller, Gelnhausen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

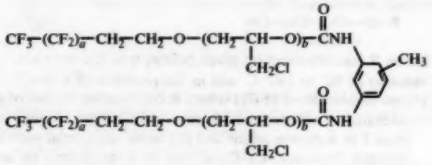
Filed Aug. 28, 1986, Ser. No. 901,247

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1985, 3530967; Feb. 22, 1986, 3605844

Int. Cl.[4] C07C *125/073*

U.S. Cl. 560—33 3 Claims

1. A urethane containing perfluoroalkyl and epichlorohydrin groups, of formula I below



in which a denotes a number from 5 to 17 and b denotes a number from 1 to 7.

4,709,075

PREPARATION OF ALKYL N-MALEYLPHENYLALANATE

Reinhold Keller, Bad Soden am Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

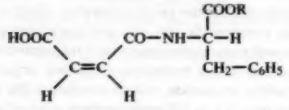
Filed Dec. 6, 1985, Ser. No. 805,618

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1984, 3444915

Int. Cl.[4] C07C *67/313*

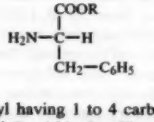
U.S. Cl. 560—41 5 Claims

1. A process for preparing the compounds of the formula I



I

which comprises reacting alkyl L-phenylalanates of the formula III



III

in which R is alkyl having 1 to 4 carbon atoms, in aqueous solution at 0° to 50° C. within the pH range from 3 to 7.5 with maleic anhydride.

4,709,076

METHODS, COMPOSITIONS AND COMPOUNDS FOR THE TREATMENT OF PROSTATIC ADENOMA

Ezio Bombardelli; Bruno Gabetta, and Marisa Conti, all of Milan, Italy, assignors to Inverni Della Beffa SpA, Milan, Italy

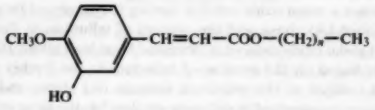
Filed Jun. 10, 1985, Ser. No. 743,073

Claims priority, application Italy, Jun. 11, 1984, 21342 A/84

Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—55 14 Claims

1. A compound of the formula



wherein n is from 13 to 25.

4,709,077

7-(ARYLOXY)-2-NAPHTHOXYALKANECARBOXYLIC ACID DERIVATIVES, PROCESSES FOR THE PREPARATION OF THESE COMPOUNDS, AS WELL AS AGENTS HAVING HERBICIDAL ACTIVITY CONTAINING THESE COMPOUNDS

Michael Harre; Hans-Rudolf Krüger; Friedrich Arndt, and Reinhart Rusch, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

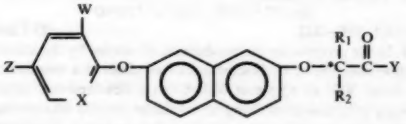
Filed Sep. 17, 1985, Ser. No. 777,053

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1984, 3434447; Jul. 15, 1985, 3525562

Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—056 64 Claims

1. A 7-(aryloxy)-2-naphthoxy-alkanecarboxylic acid derivative of the Formula



wherein

Z is trifluoromethyl

W is hydrogen or chlorine

X is CH or N,

R_1 is hydrogen or methyl,

Y is UR_3 or

U is oxygen or sulfur,

R_3 is H, a sodium atom, C_1–C_6-alkyl, methoxyethyl, ethoxyethyl, allyl, propargyl, cyclohexyl, bromopropyl, cyanoethyl, trifluoroethyl, benzyl, phenoxybenzyl, phenyl, methylphenyl, ethoxycarbonylmethyl, ethoxybarbonylethyl, or bis-0-isopropylidenexylityl,

R_9 is hydrogen, ethyl or butyl and

R_{10} is hydrogen, ethyl, butyl, phenyl, ethoxycarbonylmethyl or methoxycarbonylethyl.

4,709,078

ACRYLATES, AND FUNGICIDES WHICH CONTAIN THESE COMPOUNDS

Ulrich Schirmer, Heidelberg; Stefan Karbach, Ludwigshafen; Ernst-Heinrich Pommer, Limburgerhof; Eberhard Ammermann, Ludwigshafen; Wolfgang Steglich, Bonn-Roettgen; Barbara A. M. Schwalge, Lohmar, and Timm Anke, Kaiserslautern, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

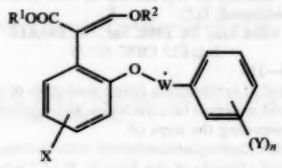
Filed May 21, 1986, Ser. No. 865,406

Claims priority, application Fed. Rep. of Germany, May 30, 1985, 3519282

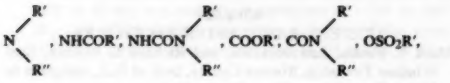
Int. Cl.[4] C07C *69/76*

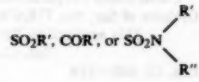
U.S. Cl. 560—060 8 Claims

1. An acrylate of the formula



where R^1 and R^2 independently of one another are each C_1–C_8-alkyl, X is hydrogen, C_1–C_4-alkyl, halogen, C_1–C_4-alkoxy, haloalkyl, cyano or nitro, W is unsubstituted or alkyl-substituted, saturated or unsaturated C_1–C_{10}-alkylene, Y is hydrogen, alkyl, haloalkyl, alkoxyalkyl, cycloalkyl, aralkyl, aryl, aryloxy, halogen, an unsubstituted or substituted C_4H_4 chain fused to the benzene radical, alkoxy, haloalkoxy, alkylthio, thiocyanato, cyano, NO_2, aralkyloxy,





and R′ and R″ independently of one another are each hydrogen, alkyl, alkoxy, alkylthio or cycloalkyl or are each phenyl which is unsubstituted or substituted by alkyl, halogen or alkoxy, and n is from 1 to 4.

4,709,079

POLYPRENYL COMPOUNDS, PROCESS FOR THE PRODUCTION THEREOF AND MEDICINES CONTAINING SAME

Isao Yamatsu; Shinya Abe, both of Ibaragi; Yuichi Inai, Tokyo; Takeshi Suzuki, Ibaragi; Kensaku Kinoshita, Abiko; Mannen Mishima, Ibaragi; Yoshinori Katoh, Misato; Seiichi Kobayashi, Tsuchiura; Manabu Murakami, Ibaragi, and Kouzi Yamada, Toride, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

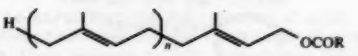
Division of Ser. No. 609,664, May 14, 1984, Pat. No. 4,576,963, which is a division of Ser. No. 396,184, Jul. 8, 1982, Pat. No. 4,455,316. This application Jan. 17, 1986, Ser. No. 820,488

Claims priority, application Japan, Jul. 23, 1981, 56-114371

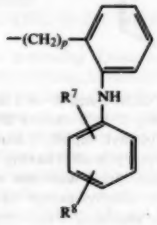
Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—66 18 Claims

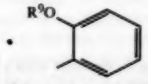
1. A compound having the formula:



wherein R is selected from the group consisting of (1) a group having the formula:



in which R^7 and R^8 are the same or different and each represents hydrogen, lower alkyl, halogen or trifluoromethyl and p represents an integer of 0 or 1, and (2) a group having the formula:



in which R^9 represents hydrogen or acetyl, and n represents an integer of 2 or 3.

4,709,080

POLYACYL ARYL ARYLATES

James Spanswick, Wheaton, and George E. Kuhlmann, Lisle, both of Ill., assignors to Standard Oil Company, Chicago, Ill.

Continuation of Ser. No. 520,637, Aug. 8, 1983, abandoned, which is a continuation of Ser. No. 345,661, Feb. 4, 1982, abandoned, which is a continuation of Ser. No. 812,816, Jul. 5, 1977, abandoned. This application Oct. 14, 1986, Ser. No. 918,834

Int. Cl.[4] C07C *69/80*

U.S. Cl. 560—86 2 Claims

1. 3,4,3′,4′-tetracarboxyphenylbenzoate.

4,709,081

PROCESS FOR THE PREPARATION OF DIPHENYL ETHER DERIVATIVES

Gergely Héja; Dezsó Korbonits; Endre Pálosi; Pál Kiss; Csaba Gönczi; Ida Szvoboda née Kanzel; Ede Márványos; Judit Kun; Mária Szomor née Wundele; Gábor Szabó; Tamás Kállay, and László Ledniczky, all of Budapest, Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara R.T., Budapest, Hungary

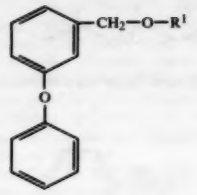
Continuation of Ser. No. 281,478, Jul. 8, 1981, abandoned. This application Sep. 26, 1985, Ser. No. 781,303

Claims priority, application Hungary, Jul. 10, 1980, 1719/80

Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—100 11 Claims

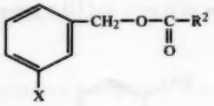
1. A process for the preparation of a compound of the formula (I)



(I)

wherein

R^1 is hydrogen or COR^2, and R^2 is a straight or branched chain alkyl having 1 to 8 carbon atoms which can be substituted with phenyl, naphthyl, tetrahydronaphthyl, or m-phenoxy-benzyl; cycloalkyl having 3 to 6 carbon atoms which can be substituted with one or more straight or branched alkyl or alkenyl groups having 1 to 6 carbon atoms, phenyl or naphthyl, which comprises etherifying an ester of the formula (II)



(II)

where X is chlorine or bromine with a phenol alkali metal salt, the latter present in a 10 to 100 mole % excess, to yield a compound of the formula (I) wherein R^1 is COR^2 and in the case where the compound of the formula (I) to be produced is directed to R^1 as hydrogen, hydrolyzing the compound of the formula (I) where R^1 is COR^2 to yield the desired product.

4,709,082

2-PHENYLPROPIONIC ACID ESTERS, METHOD FOR OPTICAL RESOLUTION THEREOF AND OPTICALLY ACTIVE SUBSTANCE THEREOF

Yasuhiro Takahashi, Chiba; Kazutaka Arai, Yotsukaido; Yoshio Ohara, Narashino; Hiroo Matsumoto, Funabashi, and Syuuzi Tsuchiya, Shiroimachi, all of Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

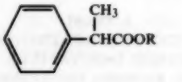
Filed Oct. 21, 1985, Ser. No. 789,640

Claims priority, application Japan, Oct. 25, 1984, 59-224742; Oct. 25, 1984, 59-224743

Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—105 **20 Claims**

1. A method for optical resolution of a 2-phenylpropionic acid ester of Formula (I):



(I)

wherein R represents p-nitrophenyl group, 8-naphthyl group or 2-(β-naphthyl)ethyl group,

which comprises

(i) effecting crystallization for optical resolution by seeding either one of the optical isomers of said 2-phenylpropionic acid ester into a super-saturated solution of a racemic modification of said ester or a mixture in which one of the optical isomers of said ester exists in excess over the other optical isomer; said solution optionally containing a racemizing agent comprising a strongly basic amine or ROM wherein R represents the R of the 2-phenylpropionic acid ester dissolved, and M represents sodium, potassium, lithium or calcium (½ Ca); or

(ii) subjecting a super-saturated solution of a racemic modification of said ester or a mixture in which one of the optical isomers of said ester exists in excess over the other optical isomer to spontaneous crystallization.

4,709,083

METHOD OF MAKING BORON ANALOGUES

Bernard F. Spielvogel, Wake, N.C., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 19, 1986, Ser. No. 864,612

Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—110 **10 Claims**

1. A method of synthesizing boron analogues of choline and choline related materials (acetylcholine and substituted acetylcholines) comprising the steps of:

reacting N,N dimethylethanolamine with hydrogen chloride or an acid chloride of the formula R—Cl where R is an organic radical chosen from the class consisting of hydrogen and organic acyls (R'CO), to form an ester hydrochloride; and reacting the resulting aminoalcohol hydrochloride or ester hydrochloride with $(C_2H_5)_4NBH_4$.

4,709,084

TERPENE-BASED ESTER TACKIFIERS

Mark S. Pavlin, Lawrenceville, and Richard L. Veazey, East Windsor Township, Mercer County, both of N.J., assignors to Union Camp Corporation, Wayne, N.J.

Division of Ser. No. 778,676, Sep. 23, 1985, Pat. No. 4,634,729. This application Jun. 5, 1986, Ser. No. 870,893

Int. Cl.[4] C07C *69/74*

U.S. Cl. 560—118 **8 Claims**

1. Terpene-based esters of formula:

$(R)_nAP$

wherein R is the residue of a conjugated diene terpene compound following Diels-Alder reaction with a acrylate-polyol ester; AP represents the reaction residue of the acrylatepolyol ester; and n is a whole number integer equal to the number of reacted acrylate groups on the acrylate-polyol ester.

4,709,085

CYCLOPROPANATION PROCESS

William A. Nugent, and Francis J. Waller, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 5, 1987, Ser. No. 444

Int. Cl.[4] C07C *69/747, 69/743, 69/74*

U.S. Cl. 560—124 **12 Claims**

1. A process for producing a cyclopropane derivative comprising contacting a diazo compound and an olefinically unsaturated compound in the presence of a catalytic amount of copper cation-exchanged perfluorinated ion exchange polymer.

4,709,086

PROCESS FOR THE PREPARATION OF 4-BENZYL ASPARTATE

Merten Schlingmann, Königstein; Hans-Ullrich Hoppe, Hofheim am Taunus, and Walter Dürsch, Königstein, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

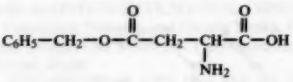
Filed Jun. 9, 1986, Ser. No. 872,250

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1985, 3520808

Int. Cl.[4] C07C *101/22*

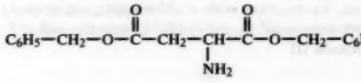
U.S. Cl. 560—171 8 Claims

1. A process for the preparation of a compound of the formula I



(I)

and of its salts, which comprises catalytic hydrogenation of a compound of the formula II



(II)

in which

Z is an inorganic or organic acid equivalent, and

m is 0 or 1, in a liquid aqueous or a liquid organic medium or a combination thereof using 0.7 to 1.3 mol of hydrogen per mole of compound of formula II under a gage pressure of 0.01 to 50 bar at a reaction temperature of −30° to 150° C., and which further comprises isolation of the compound of formula I by precipitation at pH values of from 2 to 7.

4,709,087

PROCESS FOR THE SYNTHESIS OF ISOCYANATES AND OF ISOCYANATE DERIVATIVES

Igor Tkatchenko, Caluire; Rabih Jaouhari, Rennes; Michel Bonnet, Toulouse; Gordon Dawkins, Kirkliston, and Serge Lecolier, Janville sur Juine, all of France, assignors to Societe Nationale des Poudres et Explosifs, Paris, France

Filed Dec. 27, 1985, Ser. No. 813,947

Claims priority, application France, Dec. 28, 1984, 84 19969

Int. Cl.[4] C07C *71/00*

U.S. Cl. 560—339 14 Claims

1. Process for the synthesis of isocyanates by the reaction of an organic halide chosen from the group consisting of: acyclic or cyclic vinyl halides, optionally substituted by at least one alkyl or aryl group; simple or condensed aromatic halides, optionally substituted by at least one alkyl, vinyl, aryl, halo or alkoxy group; halogenated heterocyclic compounds; allyl halides optionally substituted by at least alkyl or aryl group; straight-chain or branched or cyclic aliphatic halides; and benzyl halides, optionally substituted by at least one alkyl or aryl group with a metal cyanate in an organic medium containing at least one solvent chosen from the group consisting of di-polar aprotic solvents, saturated hydrocarbons and aromatic hydrocarbons, wherein said reaction takes place in the presence of a catalyst consisting of a complex of nickel with a phosphorus, arsenic or cyclic hydrocarbon organic ligand or mixtures thereof, and, in said complex, nickel is in a zero oxidation state.

4,709,088

PROCESS FOR PRODUCING 2,6-NAPHTHALENE-DICARBOXYLIC ACID

Isao Hirose; Tamio Amemiya, and Tokuji Sakai, all of Matsuyama, Japan, assignors to Teijin Petrochemical Industries, Ltd., Tokyo, Japan

Continuation of Ser. No. 664,049, Oct. 23, 1984, abandoned. This application Jul. 15, 1986, Ser. No. 883,479

Claims priority, application Japan, Oct. 24, 1983, 58-197558; Oct. 24, 1983, 58-197559

Int. Cl.[4] C07C *51/265, 51/16, 51/23*

U.S. Cl. 562—414 12 Claims

1. A process for producing 2,6-naphthalene-dicarboxylic acid which comprises oxidizing 2,6-diisopropylnaphthalene, its oxidation product, or mixtures thereof, as a starting material with molecular oxygen in a reaction medium containing at least 50% by weight of an aliphatic monocarboxylic acid having not more than three carbon atoms in the presence of an oxidation catalyst comprising (A) at least one heavy metal element selected from the group consisting of cobalt and manganese and (B) bromine element, wherein 2,6-diisopropylnaphthalene and/or its oxidation product is continuously or semi-continuously added to the reaction system so that it is used in a proportion of 0.1 to 5 moles per gram-atom of the heavy metal element of the oxidation catalyst, the starting material concentration within the reaction mixture being maintained during the oxidation reaction at up to 0.2 mole per gram-atom of the heavy metal element, the reaction mixture containing the resulting 2,6-naphthalene-dicarboxylic acid is partly or wholly withdrawn from the reaction system, 2,6-naphthalene-dicarboxylic acid is separated from the reaction mixture, and the mother liquor is recycled to the oxidation reaction either as such or after, as required, water is removed therefrom.

12. A process for producing 2,6-naphthalenedicarboxylic acid which comprises oxidizing 2,6-diisopropylnaphthalene as a starting material with molecular oxygen in a reaction medium containing at least 50% by weight of an aliphatic monocarboxylic acid having not more than 3 carbon atoms in the presence of an oxidation catalyst comprising (A) at least one heavy metal element selected from the group consisting of cobalt and manganese, and (B) bromine element, the 2,6-diisopropylnaphthalene being used in a proportion of 0.1 to 5 moles per gram-atom of the heavy metal element of the oxidation catalyst and the starting material concentration within the reaction mixture being maintained during the oxidation reaction at up to 0.2 mole per gram-atom of the heavy metal element.

4,709,089

METHOD FOR REFINING 2-(ARYL SUBSTITUTED) PROPIONIC ACID OR ITS SALT

Isoo Shimizu; Yasuo Matsumura, both of Yokohama, and Yoshihisa Inomata, Kawasaki, all of Japan, assignors to Nippon Petrochemicals Company, Limited, Japan

Filed Feb. 6, 1987, Ser. No. 11,734

Claims priority, application Japan, Feb. 8, 1986, 61-26246; Feb. 8, 1986, 61-26248

Int. Cl.[4] C07C *51/42*

U.S. Cl. 562—494 8 Claims

1. A method for refining 2-(aryl substituted)propionic acid or its salt which is characterized in that 2-(aryl substituted)propionic acid or its salt containing halogenated by-product is brought into contact with hydrogen in a liquid phase containing water under a basic condition at temperatures in the range of 20° C. to 170° C. in the presence of a catalyst of transition metal of the group VIII in the periodic table, thereby dehalogenating said halogenated by-product and producing highly pure 2-(aryl substituted)propionic acid or its salt.

4,709,090

METHOD OF PRODUCTION OF OXYDICARBOXYLIC ACID SALTS

Hideyuki Nishibayashi, Machida; Shigeyoshi Iio, Yokohama; Fumio Watanabe, Kawasaki, and Takakiyo Goto, Yokohama, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 701,622, Feb. 14, 1985. This application Mar. 24, 1986, Ser. No. 843,863

Claims priority, application Japan, Sep. 7, 1984, 59-186577

Int. Cl.[4] C07C *51/295*

U.S. Cl. 562—537 **16 Claims**

1. A method for the manufacture of an oxydicarboxylic acid salt which comprises subjecting to dehydrogenation an polyethylene glycol represented by the formula I:

$$HO—CH_2CH_2O)_nH$$

wherein n is 2 to 14, in the presence of the hydroxide of at least one metal selected from the group consisting of alkali metals and alkaline earth metals, water and a catalyst consisting essentially of zirconium and copper compounds in a weight ratio of between 20 and 1 parts by weight of zirconium per 1 part by weight of copper.

4,709,091

PRODUCTION OF POLYMALEIC ACID

Yasuhisha Fukumoto, and Moboru Moriyama, both of Wakayama, Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Mar. 27, 1985, Ser. No. 716,792

Claims priority, application Japan, Apr. 6, 1984, 59-68564

The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.

Int. Cl.[4] C07C *51/347*

U.S. Cl. 562—595 **11 Claims**

1. A process for preparing a homoplymer of maleic acid, which comprises the steps of:

neutralizing a monomer of (I) maleic acid or maleic anhydride in an aqueous medium with (III) an alkali metal hydroxide or ammonia so that the molar ratio of (I) to (III) in the aqueous medium is in the range of 100:00 to 100:90,

beginning the polymerization of the monomer in the presence of a polymerization initiator,

adding a further amount of said alkali metal hydroxide or ammonia so that the molar ratio of (I):(III) in the aqueous medium is from 100:100 to 100:130,

then completing the polymerization of said monomer (I).

4,709,092

PROCESS FOR THE PREPARATION OF 2-ALKOXYBENZOSULFONAMIDES

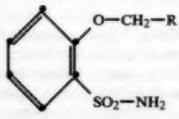
Franz-Josef Jaeggi, Baton Rouge, La., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 5, 1986, Ser. No. 836,288

Int. Cl.[4] C07C *143/78*

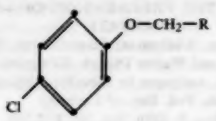
U.S. Cl. 564—89 **6 Claims**

1. A process for the preparation of a 2-alkoxybenzosulfonamide of formula I



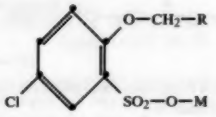
(I)

wherein R is chloromethyl, methoxymethyl, C_1–C_4alkyl or trifluoromethyl, which process comprises reacting a 4-alkoxychlorobenzene of formula II



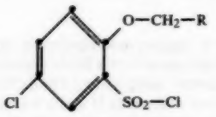
(II)

wherein R is as defined for formula I, at a temperature between 0° C. and +150° C. with about one equivalent of chlorosulfonic acid, neutralizing the reaction mixture with an aqueous solution of alkali metal hydroxide at a temperature between 0° C. and +100° C. and converting the resultant sulfonic acid alkali metal salt of formula V



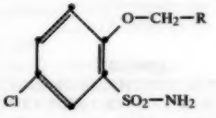
(V)

wherein R is as defined for formula I and M is a sodium or potassium atom, by reaction with a chlorinating agent at a temperature between +60° C. and +120° C. into the sulfonyl chloride of formula III



(III)

wherein R is as defined for formula I, and converting said sulfonyl chloride with ammonia into the sulfonamide of formula IV



(IV)

wherein R is as defined for formula I, and hydrogenating said sulfonamide with hydrogen at a temperature between +20° C. and +70° C. and at a pressure range from 1 to 5 bar in an inert solvent and in the presence of a precious metal catalyst and an acid acceptor.

4,709,093

METHOD FOR THE PREPARATION OF 4-PHENYL-1,3-BENZODIAZEPINES AND PRECURSORS THEREOF

Thomas B. K. Lee, Whitehouse Station, and George E. Lee, Somerville, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Continuation of Ser. No. 267,990, May 28, 1981, abandoned. This application Jul. 23, 1985, Ser. No. 757,765

Int. Cl.[4] C07C *103/44*

U.S. Cl. 564—220 **1 Claim**

1. N-[2-(2-methylamino-2-phenylethyl)phenyl]-2,2-dimethylpropanamide.

4,709,094

SIGMA BRAIN RECEPTOR LIGANDS AND THEIR USE

Eckard Weber; Mark Sonders, both of Portland, and John F. Keana, Eugene, all of Oreg., assignors to State of Oregon, acting by and through the Oregon State Board of Higher Education, acting for and on behalf of the Oregon Health Sciences University and the University of Oregon, Portland, Oreg.

Filed Jul. 10, 1986, Ser. No. 884,150

Int. Cl.[4] C07C *129/12*

U.S. Cl. 564—238 **23 Claims**

1. 1,3-Di-(4-halo-2-methylphenyl)-guanidine.

4,709,095

ORTHO-AMINOMETHYLPHENOL COMPOUNDS

Tsutomu Yamanaka, Nakatsu, and Osamu Yaoka, Chikujo, both of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

PCT No. PCT/JP85/00440, § 371 Date Mar. 25, 1986, § 102(e) Date Mar. 25, 1986, PCT Pub. No. WO86/01201, PCT Pub. Date Feb. 27, 1986

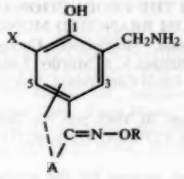
PCT Filed Aug. 2, 1985, Ser. No. 853,809

Claims priority, application Japan, Aug. 6, 1984, 59-164460

Int. Cl.[4] A61K *31/15*; C07C *131/00*

U.S. Cl. 564—253 **9 Claims**

1. An ortho-aminomethylphenol compound of the formula:



or a pharmaceutically acceptable salt thereof, wherein X is hydrogen or halogen, R is hydrogen or alkyl having 1 to 4 carbon atoms and A is alkyl having 1 to 4 carbon atoms, phenyl, benzyl or a bivalent radical selected from $-(CH_2)_3-$ —and $-O(CH_2)_2-$—and joined together with the 3 or 5 position of the benzene nucleus to form a bicycle.

9. A pharmaceutical composition for the treatment of a disease caused by inflammation, edema or hypertension comprising a therapeutically effective amount of a compound of claim 1 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable salt.

4,709,096

STILBENE DERIVATIVES, DISTYRYL DERIVATIVES AND ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR COMPRISING AT LEAST ONE OF THE DERIVATIVES

Masaomi Sasaki, Susono, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

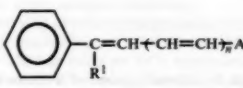
Division of Ser. No. 595,022, Mar. 30, 1984. This application Feb. 22, 1985, Ser. No. 704,675

Claims priority, application Japan, Apr. 14, 1983, 58-64526; Apr. 14, 1983, 58-64527; Apr. 14, 1983, 58-64528; Apr. 14, 1983, 58-64529

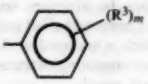
Int. Cl.[4] C07C *87/28, 87/54*

U.S. Cl. 564—374 **11 Claims**

1. A stilbene derivative of the formula



wherein R^1 represents an alkyl group or an aralkyl group, Ar^1 represents



in which R^3 independently represents hydrogen, an alkyl group, an alkoxy group, halogen or a substituted amino group represented by

wherein R^4 and R^5 each represent an alkyl group, an unsubstituted or substituted aralkyl group, or an unsubstituted or substituted aryl group, with the proviso that at least one of R^4 and R^5 is unsubstituted aralkyl, substituted aralkyl, unsubstituted aryl or substituted aryl, m is an integer of 1, 2 or 3, with the proviso that one R^3 is

and when m is an integer of 2 or 3, R^3's may be the same or different, and n is an integer of 0 or 1.

4,709,097

CONVERSION OF 1,3-DIOXANES TO 4-OXA-ALDEHYDES

Wolfgang Hoelderich; Franz Merger, both of Frankenthal, and Rolf Fischer, Heidelberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

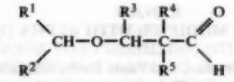
Filed Apr. 14, 1986, Ser. No. 851,782

Claims priority, application Fed. Rep. of Germany, Apr. 17, 1985, 3513725

Int. Cl.[4] C07C *45/60*

U.S. Cl. 568—443 **15 Claims**

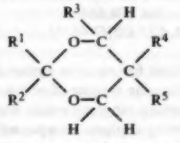
1. A process for the preparation of a 4-oxa-aldehyde of the formula



(I)

which process comprises:

catalytically isomerizing a 1,3-dioxane of the formula



(II)

where R^1, R^2, R^4 and R^5 in formulae (I) and (II) are identical or different and are each hydrogen, a straight-chain or branched alkyl, alkenyl or alkinyl radical of not more than 18 carbon atoms, cycloalkyl or cycloalkenyl, each of 5 to 8 carbon atoms, aryl, alkylaryl, aralkyl, aralkenyl or alkenylaryl, each of 6 to 16 carbon atoms, or

a heterocyclic radical, and furthermore the radicals R^1 and R^2 and/or the radicals R^4 and R^5, together with the carbon atom to which they are bonded, may form a cycloalkane, a cycloalkene or a heterocyclic structure, and R^3 is hydrogen or a straight chain or branched alkyl radical, using an acid zeolite catalyst which is undoped or doped by a metal selected from the group consisting of transition metals, noble metals and rare earth metals.

4,709,098

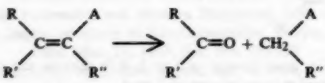
HYDROLYSIS OF ACTIVATED OLEFINIC KETONES AND ALDEHYDES

Joseph E. Dolfini, and Jerome Glinka, both of Cincinnati, Ohio, assignors to Mallinckrodt, Inc., St. Louis, Mo.

Filed Feb. 4, 1987, Ser. No. 10,902
Int. Cl.[4] C07C *45/42*
U.S. Cl. 568—491 **8 Claims**

1. A method of hydrolyzing an activated olefin to produce a carbonyl-containing compound comprising:

conducting the reaction of an acyclic olefin represented by the following chemical equation:



to produce said carbonyl-containing compounds, wherein R, R′ and R″ are hydrogen, alkyl, cycloalkyl or aryl hydrocarbon groups or substituted derivatives thereof and A of said olefin is a radical selected from the class of aldehyde or ketone which is conjugated with said olefin, R″ can also be an A, and

conducting said reaction at substantially neutral pH at a temperature of about 200° to about 300° C. and a pressure of about 225 to about 1250 psi and in the presence of water.

4,709,099

POLYETHERS MODIFIED WITH ALPHA OLEFIN OXIDES

Edward J. Panek, Trenton, and Pauls Davis, Gilbraltar, both of Mich., assignors to BASF Corporation, Parsippany, N.J.

Division of Ser. No. 615,613, May 31, 1984, Pat. No. 4,665,239, which is a continuation of Ser. No. 249,880, Apr. 1, 1981, abandoned, which is a continuation-in-part of Ser. No. 86,840, Oct. 22, 1979, abandoned. This application May 2, 1986, Ser. No. 858,684
Int. Cl.[4] C07C *43/11*
U.S. Cl. 568—624 **1 Claim**

1. A polyether thickener for aqueous systems comprising a polyether having a molecular weight of about 1000 to about 75,000 prepared by reacting ethylene oxide with at least one active hydrogen-containing aliphatic compound selected from the group consisting of trimethylolpropane, glycerol, 2,3,5,6-hexane tetrol, sorbitol, and pentaerythritol, to prepare a homopolymer and further reacting said homopolymer with at least one alpha-olefin oxide having a carbon chain length of about 14 to about 18 aliphatic carbon atoms and wherein said alpha-olefin oxide is present in the amount of about 1 to 10 percent by weight based on the total weight of said thickener.

4,709,100

PROCESS FOR THE MANUFACTURE OF MIXTURES OF 3-PHENOXYBENZYL BROMIDE AND 3-PHENOXYBENZAL BROMIDE

Joshua Hermolin, Ramat Hasharon, and Arieh Kampf, Meitar, both of Israel, assignors to Bromine Compounds Ltd., Beer-Sheva, Israel

Filed Mar. 10, 1986, Ser. No. 837,769
Claims priority, application Israel, Apr. 1, 1985, 74775
Int. Cl.[4] C07C *41/22; C07G 13/00*
U.S. Cl. 568—639 **11 Claims**

1. A process for the manufacture of a mixture of 3-phenoxybenzyl bromide and 3-phenoxybenzal bromide, comprising the step of brominating 3-phenoxytoluene using dibromodimethylhydantoin as a brominating agent in the presence of radical initiators, wherein the bromination step is carried out in a non-polar inert solvent, at a temperature above 65 degrees Celsius using a molar ratio of the dibromodimethylhydantoin and 3-phenoxy-toluene in the range of 0.5:1 to 1.25:1 sufficient such that said mixture of 3-phenoxybenzyl bromide and said 3-phenoxybenzal bromide is substantially free of ring brominated compounds.

4,709,101

PROCESS FOR THE PRODUCTION OF METHYL ETHERS FROM BRANCHED MONOOLEFINS

Divakaran Masilamani, Morristown; George S. Hammond, Madison, and Andiappan K. S. Murthy, Lake Hiawatha, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Sep. 30, 1985, Ser. No. 781,163
Int. Cl.[4] C07C *41/06, 41/14*
U.S. Cl. 568—697 **18 Claims**

1. In an improved process for the production of methyl ethers of the type in which methanol is reacted with a branched monoolefin in the presence of a catalytically effective amount of an effective catalyst, the improvement comprising the steps of:

(a) reacting a branched monoolefin with an excess of one or more diols in the presence of an effective acid catalyst to form the corresponding monoether of said diols; and

(b) reacting said monoether with methanol in the presence of an effective acid catalyst to form a mixture comprising said methyl ether and said diols.

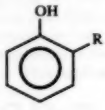
4,709,102

PROCESS FOR PRODUCING 2-LOWER ALKYL PHENOLS

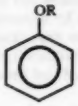
Balaram B. G. Gupta, N. Plainfield, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Oct. 7, 1986, Ser. No. 916,269
Int. Cl.[4] C07C *37/48*
U.S. Cl. 568—780 **18 Claims**

1. A process for the production of a 2-lower alkyl phenol having the formula:



wherein R is lower alkyl, by transalkylation of a lower alkyl phenyl ether having the formula:



comprising contacting a feed stream comprising said lower alkyl phenyl ether at an elevated temperature with a medium-pore, pentasil-type molecular sieve as catalyst.

4,709,103

PROCESS FOR THE PREPARATION OF ALKALI METAL ALCOHOLATES

Werner Surber, Oberwil, Switzerland, assignor to CIBA-GEIGY Corporation, Ardsley, N.Y.

Filed Feb. 14, 1986, Ser. No. 829,335

Claims priority, application Switzerland, Feb. 20, 1985, 791/85

Int. Cl.[4] C07C *29/70, 31/30*

U.S. Cl. 568—851 **4 Claims**

1. A process for the preparation of an alkali metal C_5–C_{22} tertiary alcoholate by reacting an alkali metal with a C_5–C_{22} tertiary alcohol, which process comprises adding the hot alcohol, with stirring, to the melted alkali metal, the reaction taking place in the absence of any inert solvent.

4,709,104

CRYSTALLIZATION-INHIBITED TRIMETHYLOLETHANE SOLUTIONS

Paul E. Eckler, Terre Haute, Ind., assignor to International Minerals & Chemical Corp., Terre Haute, Ind.

Filed Oct. 15, 1985, Ser. No. 787,621

Int. Cl.[4] C07C *29/94, 31/22*

U.S. Cl. 568—853 **7 Claims**

1. A method for inhibiting crystallization of trimethylolethane in a supersaturated aqueous solution thereof comprising forming said supersaturated solution in the presence of a crystallization inhibitor compound selected from the group consisting of isopropanol, s-butyl alcohol, t-butyl alcohol, 1-ethoxyethanol, 2-methoxyethanol, 1-methoxy-2-propanol, and 1-dimethylamino-2-propanol in an amount of from about 5% to about 15% by weight of the resulting solution.

5. A supersaturated aqueous solution of trimethylolethane containing about 5 to about 15 percent by weight of a crystallization-inhibitor compound selected from the group consisting of 2-ethoxyethanol, 1-methoxy-2-propanol, and 1-dimethylamino-2-propanol.

4,709,105

PREPARATION OF C_3-C_{25}-ALKANOLS

Armin V. Grenacher, Mutterstadt; Max Strohmeyer, Limburgerhof; Herwig Hoffmann, Frankenthal, and Heinrich Elliehausen, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Nov. 19, 1986, Ser. No. 932,637

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1985, 3542595

Int. Cl.[4] C07C *29/14, 31/125*

U.S. Cl. 568—883 **5 Claims**

1. In a process for the preparation of a C_3–C_{25}-alkanol by catalytic hydrogenation of the corresponding crude alkanal, as obtained in the cobalt-catalyzed hydroformylation C_2–C_{24}-olefins, the improvement comprising:

(a) carrying out the hydrogenation in a first stage to a hydrogen conversion of 80–95% at 150°–230° C. and under 10–350 bar using an SiO_2 supported catalyst which contains 5–15% by weight of nickel and 2–20% by weight of molybdenum in the form of molybdenum oxide, the percentages in each case being based on the total weight of catalyst including support; and

(b) completing the hydrogenation in a second stage at 150°–230° C. and under 10–350 bar with the aid of a cobalt catalyst whose active material consists of

55–65% by weight of cobalt,

15–20% by weight of copper,

4–10% by weight of manganese,

2–5% by weight of molybdenum in the form of molybdenum oxide, and

0–10% by weight of other activating additives.

4,709,106

PROCESS FOR DEODORIZING ISOPROPYL ALCOHOL

Günther Osterburg, Rheurdt; Karl-Heinz Gluzek, Alpen, and Wilhelm Neier, Rheinberg, all of Fed. Rep. of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Fed. Rep. of Germany

Filed Jan. 5, 1987, Ser. No. 1,131

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1986, 3608202

Int. Cl.[4] C07C *29/76, 31/10*

U.S. Cl. 568—917 **10 Claims**

1. A process for deodorizing isopropyl alcohol characterized by containing trace amounts of odor-forming components which comprises contacting said isopropyl alcohol with a strongly acidic cation exchange resin catalyst wherein said catalyst has been treated by the steps comprising

(a) loading a strongly acidic cation exchange resin with palladium in ionic form, neutralizing it with a quantity of a mixture of alkali—or alkaline earth hydroxide and -halide at a hydroxide/halide ratio of 95:5 to 75:25, the alkali or alkaline earth ions being made available at the equivalent amount relative to the free sulfonic acid groups of the cation exchange resin, or

(b) loading a strongly acidic cation exchange resin completely neutralized with alkali—or alkaline earth hydroxide with palladium in ionic form, subjecting it to after-treatment with halogen hydracid, while adjusting the acid concentration surrounding the resin at 0.01 n to 0.5 n.

4,709,107

PROCESS FOR PRODUCING NITRONES

Paul R. West, Ballston Spa, and Gary C. Davis, Albany, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 11, 1985, Ser. No. 786,937

Int. Cl.[4] C07C *76/02, 79/06, 79/10*

U.S. Cl. 568—927 **10 Claims**

1. A zinc metal reduction method for making arylnitrones or alkylnitrones which does not require a zinc oxide filtration step prior to nitrone recovery, which comprises,

(1) effecting the reduction of a nitroaromatic compound or nitroalkane with powdered zinc and sufficient ammonium chloride to produce the corresponding aromatic hydroxylamine or alkane hydroxylamine,

(2) thereafter effecting reaction between the aromatic hydroxylamine or alkanehydroxylamine with aromatic aldehyde or aliphatic aldehyde in the presence of sufficient acetic acid to substantially dissolve the zinc oxide of (1), and

(3) recovering nitrone from the mixture of (2) selected from diarylnitrone, alkylarylnitrone, and dialkylnitrone.

4,709,108

CONVERSIONS OF LOW MOLECULAR WEIGHT HYDROCARBONS TO HIGHER MOLECULAR WEIGHT HYDROCARBONS USING A METAL COMPOUND-CONTAINING CATALYST

Louis Devries, Greenbrae, and P. R. Ryason, Santa Rosa, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 547,699, Oct. 31, 1983, Pat. No. 4,599,474. This application Jun. 27, 1986, Ser. No. 879,706

The portion of the term of this patent subsequent to Jul. 8, 2003, has been disclaimed.

Int. Cl.[4] C07C *2/00*

U.S. Cl. 585—415 **15 Claims**

1. A process for the production of higher molecular weight hydrocarbons from lower molecular hydrocarbons comprising the steps of:

(a) introducing into a reaction zone a lower molecular weight hydrocarbon-containing gas and contacting said gas in said zone with a metal compound-containing catalyst having a surface area in the range 0.1 to 10 m^2/gram and containing a carbide, nitride, boride or oxide of a Group I-A metal, under C_2+ hydrocarbon synthesis conditions such that at least 15 mole percent of the lower molecular weight hydrocarbons in said gas are converted to higher molecular weight hydrocarbons, said conditions including a temperature of greater than 1000° C. and a gas hourly space velocity of greater than 3200 hr^{-1};

(b) withdrawing from said reaction zone a higher molecular weight hydrocarbon-containing stream.

4,709,109

PREPARATION OF ALKENYLAROMATICS

Karin Sperling, Wachenheim, and Martin Fischer, Ludwigshafen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

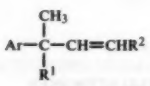
Filed Oct. 10, 1986, Ser. No. 917,906

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1985, 3536929

Int. Cl.[4] C07C *15/46*

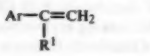
U.S. Cl. 585—438 **15 Claims**

1. A process for the preparation of an alkenylaromatic of the formula I



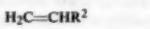
I

where R^1 is alkyl of 1 to 6 carbon atoms, R^2 is hydrogen or alkyl of 1 to 10 carbon atoms and Ar is unsubstituted or substituted aryl, by reacting a vinylaromatic of the formula II



II

with an α-olefin of the formula III

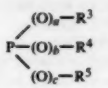


III

in the presence of a nickel-containing catalyst system, wherein the improvement comprises using a catalyst system prepared by mixing

(a) an Ni (II) salt of a carboxylic acid, of an alcoholate and/or a phenolate,

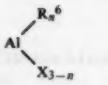
(b) a trivalent organic phosphorus compound of the formula IV



IV

where R^3, R^4 and R^5 are each alkyl, cycloalkyl, aryl or aralkyl and the indices a, b and c are each zero or 1, and

(c) an organoaluminum compound of the formula V



V

where the radicals R^6 are identical or different alkyl groups of 1 to 12 carbon atoms, X is halogen and n is 1 or 2, or a mixture of two compounds of the formula V, the molar ratio of nickel to phosphorus being from 1:0.5 to 1:10 and that of nickel to aluminum being from 1:1 to 1:20.

4,709,110

CATALYTIC CONVERSION WITH BORON TRIFLUORIDE TREATED ZEOLITE

Paul G. Rodewald, Rocky Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 787,943, Oct. 16, 1985, abandoned, which is a continuation-in-part of Ser. No. 701,313, Feb. 13, 1985, Pat. No. 4,567,310, which is a continuation-in-part of Ser. No. 526,764, Aug. 26, 1983, abandoned, which is a continuation of Ser. No. 355,419, Mar. 8, 1982, abandoned. This application May 6, 1986, Ser. No. 860,370

Int. Cl.[4] C07C *2/70, 2/68, 4/12, 5/22*

U.S. Cl. 585—463 **27 Claims**

1. A process for converting feedstock comprising aromatic compounds selected from the group consisting of benzene, monocyclic alkyl-substituted benzene of from 7 to 10 carbon atoms and mixtures thereof, alkyl being methyl, ethyl or a combination thereof, to alkylation product which comprises contacting said feedstock at conversion conditions suitable to convert said feedstock to said product with an alkylating agent and a catalyst composition comprising a crystalline zeolite having been modified by the method comprising contacting said zeolite having a silica-to-alumina mole ratio of from about 30 to about 300 and a Constraint Index of from about 1 to about 12 with gaseous boron trifluoride in the absence of alumina-containing binder and under a combination of conditions of temperature, contact time and pressure, said combination of conditions being effective to reduce the activity of the zeolite for cracking normal hexane as measured by the alpha test conducted at 538° C.

10. A process for converting feedstock comprising toluene to conversion product comprising benzene and xylene which comprises contacting said feedstock at conversion conditions suitable to covert said feedstock to said product with a catalyst composition comprising a crystalline zeolite having been modified by the method comprising contacting said zeolite having a silica-to-alumina mole ratio of from about 30 to about 300 and a Constraint Index of from about 1 to about 12 with gaseous boron trifluoride in the absence of alumina-containing binder and under a combination of conditions of temperature, contact time and pressure, said combination of conditions being effective to reduce the activity of the zeolite for cracking normal hexane as measured by the alpha test conducted at 538° C.

19. A process for converting feedstock comprising xylenes to isomerization product which comprises contacting said feedstock at conversion conditions suitable to convert said feedstock to said product with a catalyst composition comprising a crystalline zeolite having been modified by the method comprising contacting said zeolite having a silica-to-alumina mole ratio of from about 30 to about 300 and a Constraint

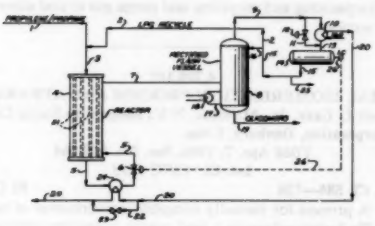
Index of from about 1 to about 12 with gaseous boron trifluoride in the absence of alumina-containing binder and under a combination of conditions of temperature, contact time and pressure, said combination of conditions being effective to reduce the activity of the zeolite for cracking normal hexane as measured by the alpha test conducted at 538° C.

4,709,111

OLIGOMERIZATION PROCESS WITH INTEGRATED HEAT UTILIZATION

Dennis J. Ward, South Barrington, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Feb. 27, 1987, Ser. No. 19,824
Int. Cl.[4] C07C *2/02*
U.S. Cl. 585—503 **15 Claims**



1. A catalytic oligomerization process which comprises the steps:

(a) passing a liquid-phase feed stream comprising a C_2–C_5 aliphatic feed olefinic hydrocarbon into contact with an oligomerization catalyst within a reaction vessel and producing a reaction zone effluent stream comprising the feed hydrocarbon and a C_6-plus product hydrocarbon, with the reaction zone comprising a tubular catalyst retaining means which is in indirect heat exchange relationship with a coolant media which is vertically circulated through the reaction vessel to remove heat released in the oligomerization reaction, with a portion of the coolant media being vaporized within the reaction vessel;

(b) cooling the reaction zone effluent stream by indirect heat exchange against a cooling stream;

(c) passing the reaction zone effluent stream through the reaction vessel as said coolant media; and,

(d) passing coolant media withdrawn from the reaction vessel into a separation zone operated at conditions effective to separate the entering hydrocarbons into an overhead vapor stream comprising the feed hydrocarbon and a net bottoms liquid stream comprising the product hydrocarbon which is removed from the process as a product stream.

4,709,112

PROCESS FOR DIMERIZING LOWER α-OLEFINS

Hiroshi Sato, Ibaraki; Kiyoshi Ikimi, Otokuni; Hideto Tojima, Kyoto, and Mikoto Takahashi, Oita, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 30, 1986, Ser. No. 947,873
Claims priority, application Japan, Jan. 6, 1986, 61-001168; Mar. 22, 1986, 61-064531
Int. Cl.[4] C07C *2/24*
U.S. Cl. 585—513 **5 Claims**

1. A process for dimerizing lower α-olefins, which comprises dimerizing a lower α-olefin in the presence of a catalyst system comprising the following components:

(A) an organic acid salt or complex of nickel,

(B) a trialkylaluminum,

(C) at least one trivalent phosphorus compound of the following formula (I), (II) or (III):

$$PR^1R^2R^3 \quad \text{(I)}$$

$$P(NR^1{}_2)_3 \quad \text{(II)}$$

$$P(OR^1)_3 \quad \text{(III)}$$

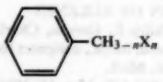
wherein R^1, R^2 and R^3 are independently an alkyl, a cycloalkyl, an aryl, or an aralkyl, and

(D) a fluorinated isopropanol of the following formula (IV):

$$CF_mH_{3-m}-\underset{\displaystyle OH}{\underset{|}{CH}}-CF_nH_{3-n} \quad \text{(IV)}$$

wherein m and n are each an interger satisfying the formula: $4 \leqq m+n \leqq 6$, and

(E) a catalyst co-activator of at least one compound selected from halogenated compounds of the following formulae (V) and (VI):



(V)

and

$$R^4R^5R^6CX \quad \text{(VI)}$$

wherein X is a halogen atom, R^4, and R^5 and R^6 are each an alkyl, and n is an integer of 1 to 3, in an amount of 0 mole to less than equimolar to the trialkylaluminum.

4,709,113

CONVERSION OF CRUDE METHANOL TO GASOLINE WITH EXTRACTION

Mohsen N. Harandi, Sewell; Hartley Owen, Belle Mead, and Sean C. Smyth, Plainsboro, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 29, 1987, Ser. No. 43,718
Int. Cl.[4] C07C *1/20*
U.S. Cl. 585—640 **8 Claims**

1. A continuous process for converting crude methanol to gasoline boiling range hydrocarbons in a catalytic reaction zone with a crystalline acid zeolite catalyst at elevated temperature and pressure comprising the steps of:

(a) contacting a crude methanol feedstock containing a minor amount of water with a liquid hydrocarbon extraction stream under extraction conditions favorable to selective extraction of the methanol, thereby providing an extract liquid stream rich in methanol and an aqueous raffinate stream lean in methanol;

(b) charging the extracted methanol substantially free of water to said reation zone under process conditions to convert substantially all methanol to hydrocarbons;

(c) cooling reaction effluent to recover aqueous liquid by-product stream, gas rich in C_2^+ hydrocarbons, liquid rich in C_3–C_4 and C_5^+ hydrocarbons; and

(d) contacting crude methanol feedstock with at least a portion of the liquid hydrocarbons employed as extraction liquid.

4,709,114

CATALYTIC OXYGENATE CONVERSION

Paul G. Rodewald, Rocky Hill, N.J., and Ernest W. Valyocsik, Yardley, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 749,242, Jun. 27, 1985, abandoned, which is a continuation-in-part of Ser. No. 705,821, Feb. 26, 1985, abandoned. This application Sep. 11, 1986, Ser. No. 905,996

Int. Cl.[4] C07C *1/00, 11/20*

U.S. Cl. 585—640 **19 Claims**

1. A process for converting a feedstock comprising organic compounds selected from the group consisting of alcohol, carbonyl, ether and mixtures thereof to conversion product comprising hydrocarbon compounds, which comprises contacting said feedstock at conversion conditions including a temperature of from about 150° C. to about 600° C., a pressure of from about 0.5 atmosphere to about 50 atmospheres and a weight hourly space velocity of from about 0.5 hr^{-1} to about 100 hr^{-1} with a catalyst composition comprising crystalline zeolite ZSM-58.

4,709,115

DISPROPORTIONATION OF ALKENES

Chu W. Jung, Arlington, Mass.; Philip E. Garrou, Charlotte, N.C., and Gary R. Strickler, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 863,627, May 15, 1986, abandoned, which is a continuation of Ser. No. 473,928, Mar. 10, 1983, abandoned. This application Oct. 9, 1986, Ser. No. 917,447

Int. Cl.[4] C07C *6/00*

U.S. Cl. 585—643 **20 Claims**

1. A process for the disproportionation of alkenes, comprising contacting a composition containing at least one alkene with a catalyst containing at least one rhenium compound or complex in a distillation column reactor er such reaction and fractionation conditions that there are formed products of the disproportionation of at least one of said alkenes, and such that the combined yield of said products is at least about 65 mole percent.

4,709,116

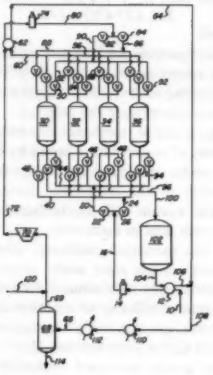
ISOMERIZATION PROCESS AND APPARATUS

Andrew S. Zarchy, Amawalk; Warren K. Volles, Mt. Kisco, and Luke F. O'Keefe, White Plains, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Jun. 30, 1986, Ser. No. 879,909

Int. Cl.[4] C07C *5/13*

U.S. Cl. 585—738 **20 Claims**



1. A process for upgrading the octane of a hydrocarbon feed containing non-normal hydrocarbon compounds and normal pentane and hexane, comprising:

(a) passing said hydrocarbon feed to an adsorption section containing an adsorber bed to adsorb normal hydrocarbons from said feed, and to pass non-normal hydrocarbons out of the adsorption section as adsorber effluent;

(b) passing purge gas through said adsorber bed containing adsorbed normal hydrocarbons to produce a desorption effluent comprising purge gas and normal hydrocarbons;

(c) passing said desorption effluent through an isomerization reactor to produce a reactor effluent comprising purge gas and reactor hydrocarbon product comprising non-normal and normal hydrocarbons;

(d) combining at least a portion of said reactor product stream with said adsorber effluent to form an enriched octane product stream comprising normal and non-normal hydrocarbons; and

(e) separating and recycling said purge gas to said adsorption section.

4,709,117

TOTAL ISOMERIZATION PROCESS AND APPARATUS

Robert L. Gray, Jr., Mahopac, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Apr. 7, 1986, Ser. No. 849,064

Int. Cl.[4] C07C *5/13*

U.S. Cl. 585—738 **56 Claims**

1. A process for virtually complete isomerization of normal paraffin hydrocarbons in a feed stream containing normal and non-normal hydrocarbons, comprising:

(a) passing a combined reactor feed comprising said feed stream and a desorption effluent, as hereinafter delineated, through an isomerization reactor containing an isomerization catalyst maintained under a hydrogen partial pressure sufficient to prevent coking of the isomerization catalyst at the reaction conditions maintained therein, to convert at least a portion of the normal hydrocarbons in said reactor feed to non-normal hydrocarbons which are withdrawn from the reactor in a reactor effluent;

(b) separating reactor effluent into a hydrogen-rich gas stream and an adsorber feed stream;

(c) passing the adsorber feed stream to an adsorption section containing an adsorber bed to adsorb normal hydrocarbons from said reactor effluent, and passing non-normal hydrocarbons out of the adsorption section as adsorber effluent containing an isomerate product;

(d) forming a hydrogen recycle stream by adding essentially pure hydrogen to at least a portion of said hydrogen-rich gas stream in an amount sufficient to make up hydrogen lost during processing;

(e) passing said hydrogen recycle stream through said adsorber bed containing adsorbed normal hydrocarbons to produce said desorption effluent which comprises hydrogen and normal hydrocarbons; and

(f) passing said desorption effluent to said isomerization reactor.

4,709,118

REMOVAL OF MERCURY FROM NATURAL GAS AND LIQUID HYDROCARBONS UTILIZING DOWNSTREAM GUARD CHABMER

Tsoung Y. Yan, Philadelphia, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 24, 1986, Ser. No. 911,184

Int. Cl.[4] C10G *29/02*

U.S. Cl. 585—820 **25 Claims**

1. In a process wherein a hydrocarbon gas or liquid containing an undesired level of mercury is passed through a flow system and is contacted with aluminum metal processing equipment resulting in damage to said aluminum equipment, the improvement comprising inserting into the flow system

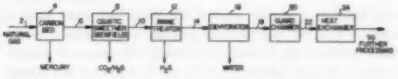
upstream of said aluminum equipment a reaction zone containing an absorbent made by:

(a) milling an oxide of a metal selected from the group consisting of bismuth and tin with an oxide selected from the group consisting of silica, aluminum hydroxide, alumina, and mixtures thereof;

(b) mixing the resulting mixture from (a) with sufficient water to form an extrudable composition;

(c) extruding said composition into pellets of predetermined size;

(d) heating said pellets to a temperature of about 300° C. to about 500° C. in an oxidizing atmosphere; and



(e) heating said pellets to a temperature of about 200° C. to about 500° C. in a reducing atmosphere.

4,709,119
PHOTOVOLTAIC CELL AND METHOD OF MAKING SAME

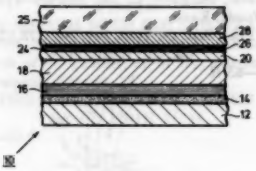
Jörg Wörner, Grosskrotzenburg, Fed. Rep. of Germany, assignor to Nukem GmbH, Hanau, Fed. Rep. of Germany

Filed Nov. 28, 1986, Ser. No. 936,090

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1985, 3542116

Int. Cl.⁴ H01L *31/06, 31/18*

U.S. Cl. 136—260 **14 Claims**



1. A photovoltaic cell having a first electrically conductive contact, a first semiconductor layer, a second semiconductor layer of opposite type of conductivity, and a second electrically conductive contact, arranged in the stated order in layers one above the other, and a further layer capable of being tunnelled through by electrons and holes, said further layer being arranged between one of the semiconductor layers and the nearest electrically conductive contact,

characterized in that

the further layer is a semiconductor inversion layer not permeable to ions, that the inversion layer is formed on the said one semiconductor layer, and that a low-resistivity layer that conducts electrons or holes well is arranged between the semiconductor inversion layer and the said nearest electrically conductive contact.

2. A photovoltaic cell according to claim **1** in the form of a $Cu_{2-x}S/CdS$ thin film solar cell,

characterized in that

the $Cu_{2-x}S$ layer is a p-semiconductor layer and highly stoichiometric with approx. $x=0.0000$, that the inversion layer is an n-semiconductor layer and is formed from the surface of the $Cu_{2.0000}S$ layer, and that a $Cu_{2-y}O$ layer with $0 \leqq y \leqq 1$ is arranged between the inversion layer and the electrically conductive contact.

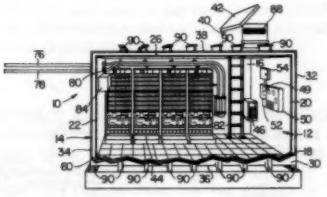
4,709,120
UNDERGROUND UTILITY EQUIPMENT VAULT

Dean C. Pearson, 870 Golden Meadow Ct., Waukesha, Wis. 53186

Filed Jun. 6, 1986, Ser. No. 871,281

Int. Cl.⁴ H02G *3/03*

U.S. Cl. 174—16 R **7 Claims**



1. An improved underground utility equipment vault comprising:

(a) an inner chamber constructed from a non-electrically conductive material of a selected geometric configuration;

(b) an outer chamber constructed from electrically conductive heat exchange material in a selected geometric figuration larger in overall dimension than said inner chamber;

(c) supporting means for supporting said inner chamber within said outer chamber in spaced relationship to said outer chamber;

(d) heat vent and cold air return means provided in said inner chamber for passive convection cooling communication between the interior of said inner chamber and the space the exterior of the inner chamber and the interior of the outer chamber;

(e) the exterior of said outer chamber coated with a protective dielectric coating and being further provided with cathodic protection in the form of a plurality of sacrificial anodes;

(f) said inner chamber containing electrical equipment electrically coupled to cables extending through the inner and outer chambers in electrically isolated relationship relative to said outer chamber.

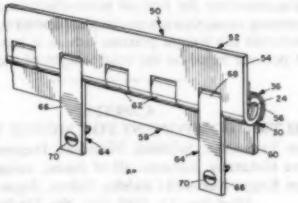
4,709,121
HINGE SEAL

Marvin W. Shores, Pomona, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.

Filed Dec. 23, 1985, Ser. No. 812,664

Int. Cl.⁴ H05K *9/00*

U.S. Cl. 174—35 R **16 Claims**



1. A hinge assembly sealed against passage of electromagnetic energy for detachably, hingedly and electrically connecting first and second conductive members; the second conductive member having a slotted orifice; said hinge assembly comprising:

a conductive attached hinge member including:

a first leaf; and

a knuckle section; said attached hinge member leaf for structural and electrical connection to a first conductive member to be joined:

a conductive insertion hinge member including:

a second leaf; and

a knuckle section; said insertion hinge member leaf for insertion into a slotted orifice in a second conductive member to be joined for retaining the insertion hinge member leaf in the plane of the slotted orifice and for making electrical contact with the second conductive member;

a conductive attaching hinge member including:

a leaf; and

a knuckle portion; said attaching member leaf for removable attachment to the second conductive member;

a first hinge sealing member of conductive material comprising;

a connecting section for attachment to and electrical contact with said first hinge leaf; and

an arcuate section shaped to fit over the knuckle section; and

a second sealing member of conductive material comprising;

a connected section for attachment to and electrical connection with the second hinge leaf; and

an arcuate section; said arcuate sections of said first and

second hinge sealing members for overlapping and making electrical contact with one another.

4,709,122

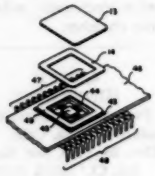
NICKEL/INDIUM ALLOY FOR USE IN THE MANUFACTURE OF A HERMETICALLY SEALED CONTAINER FOR SEMICONDUCTOR AND OTHER ELECTRONIC DEVICES

George J. Samuels, Bridgewater, N.J., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 605,436, Apr. 30, 1984, abandoned. This application Dec. 30, 1985, Ser. No. 814,698

Int. Cl.⁴ H01L *23/10*

U.S. Cl. 174—52 FP **35 Claims**



1. In an improved hermetic sealing cover for hermetically sealing a container for one or more electronic devices, said improvement comprising a cover plated with a nickel/indium alloy wherein the weight percent indium is less than about 10 weight percent based on the total weight of the alloy.

4,709,123

ELECTRIC COMPONENT FOR MOTOR VEHICLES

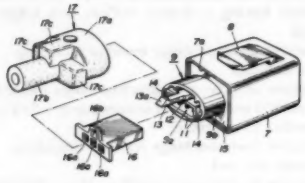
Akihiko Yamashita, Saitama; Masahiko Ikegami, Tokyo, and Kaoru Hatanaka, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 13, 1985, Ser. No. 775,964

Claims priority, application Japan, Sep. 13, 1984, 59-140140

Int. Cl.⁴ H01H *50/04, 50/12, 9/04*

U.S. Cl. 174—52 R **4 Claims**



1. An electric component for use in a motor vehicle comprising:

a casing containing a relay circuit therein and having an opening;

a terminal holder having a rounded surface and being fixed at the opening of said casing in a manner such that said terminal holder projects outwardly;

a coupling arm fixed within and projectiang outwardly out of said terminal holder;

a filling material filled in a clearance between said opening and said terminal holder;

an electric terminal positioned within said terminal holder and connected to said relay circuit;

a vent hole provided in a clearance between the inner periphery of said terminal holder and said electric terminal, said vent hole communicating to the inside of said casing;

a coupler having a hole therein, said hole being adopted to receive an electric wire in one end and said hole said electric terminal in its other end, said coupler further provided with an engagement portion engaged with said coupling arm; and

a flexible cover covering said terminal holder and said coupler, and being adapted to cover a short length of an electric wire.

4,709,124

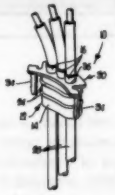
WATERTIGHT ELECTRICAL CONNECTOR

Charles F. Wheeler, Olathe, and Darryl M. Nielsen, Lenexa, both of Kans., assignors to The Marley-Wylain Company, Mission Woods, Kans.

Filed Sep. 19, 1985, Ser. No. 778,128

Int. Cl.⁴ H02G *3/18*

U.S. Cl. 174—65 R **8 Claims**



7. A water-resistant electrical connector comprising:

a member having a relatively resilient body portion and a relatively resilient projection extending outwardly from said body portion,

said member having walls defining a passageway extending through said projection and said body portion,

said walls being configured for complemental reception of an electrical lead means through said passageway,

said member presenting a shoulder between said body portion and said projection; and

a brace engaging said shoulder and having means adapted for connection to a support,

said brace having an opening complemental to the configuration of said projection such that said brace compresses said projection and thereby urges said projection toward a position of sealing engagement with said electrical lead means,

said means adapted for connecting said brace to a support comprising an outwardly extending barbed arm.

4,709,125

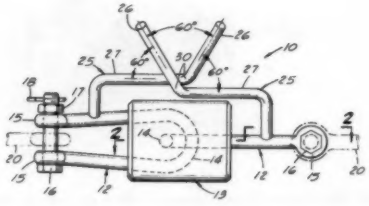
STRAIN INSULATOR WITH ARCING HORNS

Keith E. Lindsey, La Canada, Calif., assignor to Lindsey Manufacturing Company, Azusa, Calif.

Filed Jan. 8, 1987, Ser. No. 1,394

Int. Cl.⁴ H01B *17/46*

U.S. Cl. 174—140 S **14 Claims**



8. A strain insulator comprising:

a main body of high strength insulation equipped at the opposite ends thereof with a pair of metallic cable connec-

tor means having, a portion of each one thereof embedded therein;

a pair of arcing horns each attached to a respective one of said connector means exteriorly of a respective end of said main body and having V-shaped outer end portions criss-crossing, one another along one lateral side of said main body with the apexes thereof being spaced apart to form a self-extinguishing arcing gap diverging upwardly and outwardly away from said main body.

4,709,126

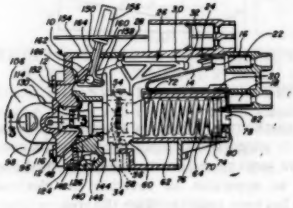
PRESSURE SWITCH WITH ROLLING DIAPHRAGM

Larry G. Miller, Montgomery; Harold E. Whiting, and Dale Willcox, both of St. Charles, all of Ill., assignors to Furnas Electric Company, Batavia, Ill.

Filed Oct. 2, 1986, Ser. No. 914,622

Int. Cl.[4] H01H *35/34*

U.S. Cl. 200—83 P **11 Claims**



1. A pressure switch including:

a housing;

electrical contacts within said housing and movable relative to each other between opened and closed positions;

a lever movably mounted within said housing and operable to effect relative movement between said electrical contacts;

biasing means within said housing and biasing said lever in a first direction, said biasing means being settable to determine the pressure level at which said switch will operate;

an over center device within said housing and connected to said lever to provide snap-action movement of said contacts between said opened and closed positions;

a pressure port in said housing for connection to a source of fluid under pressure to be monitored by said switch; and

a pressure responsive fluid motor within said housing connected in opposition to said biasing means, said fluid motor comprising a cup-shaped rolling diaphragm having a convex side in fluid communication with said pressure port, an opposite concave side defining a hollow of variable size, an output element received in said hollow and connected to said lever, and a perimetrical edge secured within said housing;

said housing having a flat face and said port being located in said flat face, said port further being surrounded by a boss having a first diameter and terminating in a reduced diameter end adapted to receive an o-ring seal.

4,709,127

CONTACT ARRANGEMENT WITH SPACERS SEPARATING CONTACT LEVERS FROM EACH OTHER

Bernd Adam, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

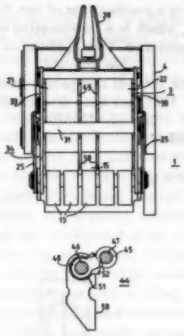
Filed Oct. 24, 1986, Ser. No. 922,682

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1985, 3539788

Int. Cl.[4] H01H *33/12*

U.S. Cl. 200—146 R **3 Claims**

1. A contact arrangement for a low-voltage circuit breaker comprising a fixed part and a movable part, the movable part comprising at least one burn-off contact lever and at least two main contact levers, said main contact levers being tiltably disposed on a holder, said holder being tiltably disposed about a first bearing pin, said main contact levers being tiltably disposed on said holder about a second bearing pin, said holder



being coupled by a coupling means to an actuating device, and further comprising spacer means disposed between ones of said main and burn-off contact levers comprising a support member arranged between the second bearing pin and a coupling pin for connecting the holder flexibly to the coupling means.

4,709,128

EASILY POSITIONABLE KEYBOARD

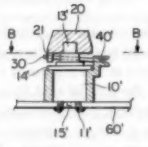
Kazuyoshi Odagawa, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 607,621, May 7, 1984. This application May 5, 1986, Ser. No. 860,697

Claims priority, application Japan, May 17, 1983, 58-84939

Int. Cl.[4] H01H *13/04*

U.S. Cl. 200—340 **6 Claims**



1. A keyboard switch comprising:

a key switch;

a key top mounted on said key switch; stress transmission means for transmitting to a plurality of areas of said key top a depression force applied to said key top;

a common member which supports said stress transmission means and engages said key switch;

a flange fixed to said key switch; and

a fitting member formed between said flange and said common member for positioning them relative to each other.

4,709,129

MICROWAVE HEATING APPARATUS

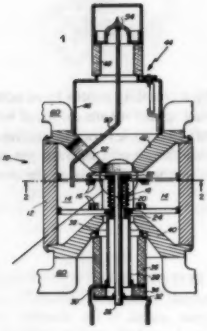
John M. Osepchuk, Concord, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 336,753, Jan. 4, 1982, abandoned, which is a continuation of Ser. No. 132,354, Mar. 20, 1980, abandoned, which is a continuation of Ser. No. 910,045, May 26, 1978, abandoned, which is a continuation of Ser. No. 751,288, Dec. 16, 1976, abandoned. This application Dec. 22, 1986, Ser. No. 945,166

The portion of the term of this patent subsequent to Sep. 16, 1997, has been disclaimed.

Int. Cl.[4] H05B *6/64*

U.S. Cl. 219—10.55 B **5 Claims**



1. A microwave source comprising:

a microwave magnetron having a directly heated thermionically emissive electron source surrounded by an anode;

said source comprising a coiled thermionically electron emissive filament whose axis is substantially coaxial with said anode, said source having end shields electrically connected to each of the ends of said filament beyond the ends of said anode;

a high voltage direct current power supply presenting a substantially inductive reactance in series with said anode and said source of said magnetron to provide a unidirectional electric field in the region between said source and said anode;

the major portion of said electric field extending radially from said filament to said anode and a minor component of said electric field in the region of said end shields extending parallel to the axis of said filament;

said magnetron having a unidirectional magnetic field in said region having a major component orthogonal to said major component of said electric field;

means for inhibiting microwave oscillations produced in said magnetron by secondary electron emission from said end shields due to motion of electrons having a component axial to said filament produced by said minor component of said electric field when said source is below temperatures producing substantial thermionic emission of electrons; and

said inhibiting means comprising an annular groove in at least one of said end shields, said groove extending radially beyond the surface of the cylindrical volume defined by said filament.

4,709,130

APPARATUS FOR SEVERING A STRIP-LIKE OR WIRE-LIKE ELECTRODE OF A SPARK EROSION MACHINE

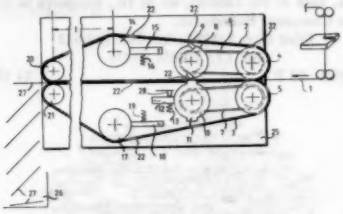
Attilio Lodetti, Losone, and Karl Tobler, Maggia, both of Switzerland, assignors to AG fur industrielle Elektronik AGIE, Losone, Switzerland

Filed Mar. 21, 1986, Ser. No. 843,360

Claims priority, application Fed. Rep. of Germany, Apr. 1, 1985, 3511930

Int. Cl.[4] B23H *7/02*; B21F *11/00*

U.S. Cl. 219—69 W **16 Claims**



1. In a spark erosion machine using a continuously renewed strip-like or wire-like tool electrode to machine an electrically conductive workpiece in an erosion zone of the spark erosion machine, an apparatus for severing the electrode after the electrode has been removed from the erosion zone, comprising a conveyor means for receiving the electrode and substantially continuously transporting the electrode to a point of disposal and a cutting means for regularly servering the electrode so that the severed electrode portions are no longer electrically connected, wherein the conveyor means includes a pair of synchronized closely spaced, electrically nonconductive face to face belts between which is conveyed the electrode, each of the belts having formed therein a plurality of corresponding, regularly spaced cutting openings; the cutting means being positioned in an operative relationship with the belts near the point of receipt of the electrode by the conveyor means and synchronized with the movement of the belts so that the cutting means severs the electrode conveyed between the belts at a cutting opening therein; the severed electrode portions being conveyed thereafter by the conveyor means to the point of disposal.

4,709,131

METHOD FOR ADAPTIVE CONTROL OF OPERATING PARAMETERS DURING SPARK-EROSIVE CUTTING AND SPARK-EROSIVE CUTTING PLANT FOR THE SAME

Athos Del Bello, Cugnasco, and Beat Kilcher, Arcegno, both of Switzerland, assignors to AG fur industrielle Elektronik AGIE Losone b. Locarno, Losone, Switzerland

Filed May 10, 1985, Ser. No. 733,003

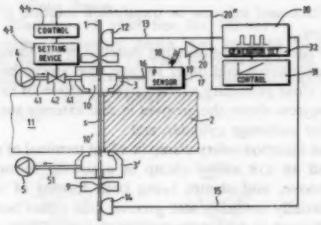
Claims priority, application Switzerland, May 11, 1984, 2355/84

Int. Cl.[4] B23H *7/02, 7/36*

U.S. Cl. 219—69 M **9 Claims**

1. In a spark-erosive cutting plant using a supplied scavenging medium to scavenge the work gap, a method for the adaptive control of operating parameters of the spark-erosive machining comprising the steps of measuring the pressure gradient of the scavenging medium in the work gap between an inlet to the work gap and an outlet of the work gap; generating a signal indicative of the pressure gradient of the scavenging medium in the work gap; comparing said signal with a signal

indicative of a desired pressure gradient of the scavenging medium in the work gap and forming an error signal there-



from; and altering at least one of said operating parameters in accordance with the error signal.

4,709,132

SATURATION MONITORING ARRANGEMENT AND METHOD OF CONTROL FOR A FREQUENCY-CONVERTER WELDING DEIVCE

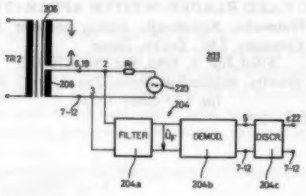
Hermann Tengler, Buchs, and Paul Mettler, Bremgarten, both of Switzerland, assignors to Elpatronic AG, Switzerland

Filed Dec. 12, 1985, Ser. No. 808,338

Claims priority, application Switzerland, Dec. 14, 1984, 5945/84

Int. Cl.⁴ B23K *11/24*

U.S. Cl. 219—110 **8 Claims**



1. Apparatus for monitoring the saturation of a welding transformer in a frequency converter welding device, the transformer receiving positive and negative current impulses from power semiconductors controlled by a control unit and having a core with three legs of which the middle leg carries the primary winding and the secondary winding, the apparatus comprising: a measuring winding (**208**) having two parts distributed respectively over two yokes (**206***c*) originating from the middle leg (**206***a*) of the transformer and being connected in series, a generator (**220**) connected to the measuring winding (**208**) to generate a measuring voltage of a specific frequency across the winding, and detector circuit means (**204**) connected to the measuring winding (**208**) in parallel with the generator (**220**) for determining by a comparison between the measuring voltage detected across the winding and a reference voltage when the inductive resistance of the measuring winding (**208**) drops below a threshold value related to saturation in order to generate a signal (FIG. **6***b*) blocking the drive of the power semiconductors (TH1–TH6).

4,709,133

WELDING APPARATUS FOR SIMULTANEOUSLY APPLYING PARALLEL WELDS TO WORKPIECES

Jack Mainville, 25 Goffe St., North, Meriden, Conn. 06450

Filed Apr. 2, 1986, Ser. No. 847,441

Int. Cl.⁴ B23K *9/12*

U.S. Cl. 219—125.1 **12 Claims**

1. Welding apparatus for simultaneously applying a number of parallel welds to workpieces to be welded together to form an assembly, said welding apparatus comprising:

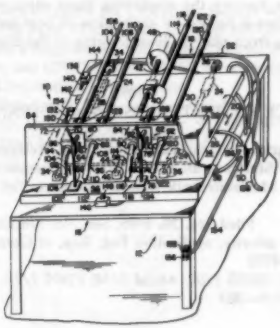
a frame having a substantially planar work surface, said work surface having a front poriton, a rear portion and sides, said front and rear poritons being spaced apart from one another;

welding means for welding the workpieces together, said welding means including a number of welding arms arranged in a spaced apart relationship to one another along the work surface and each of said arms comprising a welding station;

carriage means mounted on the frame work surface and arranged for rectilinear movement along a path extending between the front and rear portions of the frame work surface and for holding the welding arms at said welding stations, said workpieces being located on the work surface in the vicinity of a welding station so that the intersecting edges of the workpieces to be welded are in proximity to said welding arm at said welding station;

motor means for moving the carriage means along said path relative to a workpiece at said welding station;

control means coupled to said motor means and said welding means for controlling said motor means and for control-



ling said welding means to simultaneously apply parallel welding beads to the workpieces a said welding arms move relative to the workpiece;

said motor means moving said carriage means between a first and second position along said path;

first sensing means for sensing the carriage at said first position;

second sensing means for sensing the carriage at said second position;

said first and second sensing means being coupled to said control means to send signals to the control means;

first means in said control means responsive to said first sensing means for energizing said motor means and said welding means when said first position is sensed;

second means in said control means responsive to said second sensing means for de-enegizing said motor means and said welding means when said second position is sensed, and

said first responsive means in said control means includes means for delaying the energization of said motor means for a predetermined time after the energization of said welding means to permit the beginning of the welding bead to puddle prior to movement of said welding arms through the welding station.

4,709,134

ANTIFOGGING DEVICE FOR A DISPLAY GLASS OF AN INDICATING INSTRUMENT

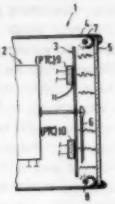
Dietmar Gaigl, Leonberg, and Klaus Amann, Rutesheim, both of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Nov. 4, 1985, Ser. No. 794,538

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1984, 3439958

Int. Cl.[4] H05B *3/22*

U.S. Cl. 219—201 **17 Claims**



1. An antifogging device for a display glass on an indicating instrument of the type having a displaying front plate arranged at a distance behind the display glass, comprising heating means for heating the displaying front plate such that said display glass is heated by absorption of heat radiated by said displaying front plate to limit fogging of the display glass.

4,709,135

DEVICE TO HEAT INFUSION AND TRANSFUSION SOLUTIONS

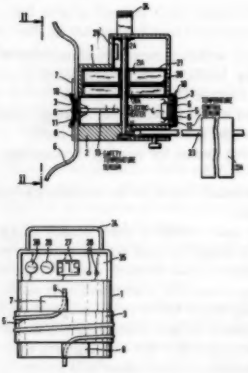
Kurt Dietrich, Salach; Axel Stihler, and Wolfgang Theilacker, both of Stuttgart, all of Fed. Rep. of Germany, assignors to Stihler Medizintechnik GmbH, Stuttgart, Fed. Rep. of Germany

Filed Sep. 20, 1985, Ser. No. 778,135

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1984, 3434772

Int. Cl.[4] H05B *1/02*; A61M *5/14*; F24H *1/12*; B67D *5/62*

U.S. Cl. 219—303 **4 Claims**



1. In a device for heating infusion and transfusion solutions that includes a heat exchange unit, means for electrically heating said unit and means for automatically controlling the temperature of said unit, the improvement which comprises:

(a) said heat exchange unit having a cylindrical outer surface with a groove running helically around said outer surface, said groove being cut into said outer surface so that the interior contour and dimensions of the groove will removably hold a tube with a clamping effect,

(b) a flexible infusion tube seated in said groove through which said infusion or transfusion solution is adapted to flow,

(c) a sheet of heat-insulating material in the form of a sleeve surrounding said outer surface, said sleeve being pressed in close proximity to the surface portion of said tube that projects above the grooves in said exterior surface of said heat exchange cylinder, and

(d) an insertion safety clamp at a first terminal of said groove and an exit safety clamp at a second terminal of said groove, said clamps being both formed of small plates partially covering said groove, said plates being secured adjacent to said groove on a surface of first and second casing portions, said casing portions being arranged on opposite end faces of said heat exchange unit, said casing portions holding said heat exchange unit therebetween with said cylindrical outer surface exposed.

4,709,136

IC CARD READER/WRITER APPARATUS

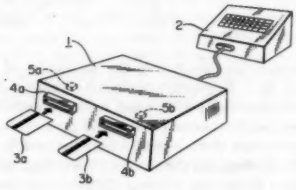
Hiroshi Watanabe, Kokubunji, Japan, assignor to Toppan Moore Company, Ltd., Tokyo, Japan

Filed Jun. 3, 1986, Ser. No. 870,102

Claims priority, application Japan, Jun. 4, 1985, 60-121083

Int. Cl.[4] G06F *15/30*

U.S. Cl. 235—379 **2 Claims**



1. An IC card reader apparatus in which information stored in IC cards placed in said apparatus is allowed to be read out by inputting cipher codes specific to said IC cards, comprising:

at least two card inserting ports for receiving IC cards, respectively;

means for detecting the insertion of said IC cards in said ports;

means for determining whether said insertion detecting means has detected the presence of said IC cards at least at said two inserting ports;

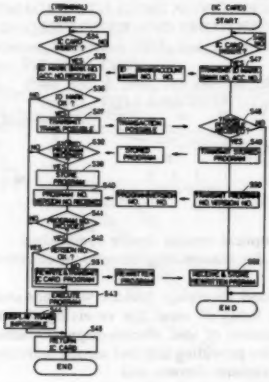
collating means for verifying whether cipher codes allocated to said two IC cards placed in said inserting ports coincide with the inputted cipher codes, respectively; and

means for permitting information to be read out from said IC cards only when said determining means has confirmed the presence of said IC cards at least at said two inserting ports and when the cipher codes of said two IC cards whose presence at said two inserting ports has been confirmed coincide with said inputted cipher codes, respectively.

4,709,137
IC CARD AND FINANCIAL TRANSACTION PROCESSING SYSTEM USING IC CARD

Shinya Yoshida, Kyoto, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Apr. 11, 1985, Ser. No. 722,011
Claims priority, application Japan, Apr. 16, 1984, 59-77104; Apr. 18, 1984, 59-79045; Apr. 18, 1984, 59-79046; Apr. 25, 1984, 59-84850; May 4, 1984, 59-89870; May 9, 1984, 59-93467
Int. Cl.[4] G06F *15/30*
U.S. Cl. 235—379 7 Claims



1. An integrated circuit card comprising:

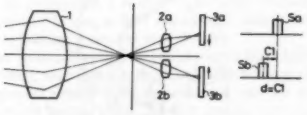
data storage means including a first storage area for storing data specifying a financial institution and a second storage area for storing at least one program for execution by a terminal with which said card is used, said program being for transaction processing procedures executable by said terminal; and

means for reading out the storage contents stored in said data storage means.

4,709,138
APPARATUS FOR DETECTING SHAKE OF IMAGE OF OBJECT

Yasuo Suda; Akira Akashi, and Akira Hiramatsu, all of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 697,938, Feb. 4, 1985, abandoned. This application Jul. 14, 1986, Ser. No. 883,436
Claims priority, application Japan, Feb. 9, 1984, 59-22419; Feb. 9, 1984, 59-22420
Int. Cl.[4] G03B *3/10*; G01J *1/20*
U.S. Cl. 250—201 14 Claims



1. A focus detection apparatus including an image forming objective optical system, for forming images whose relative positional relationship is changed in response to focusing the objective optical system, wherein said apparatus comprises:

first image detecting means for detecting an image of an object;

second image detecting means for detecting the image of the object;

signal processing means for processing signals from said first and second image detecting means in accordance with a predetermined algorithm and for producing a focus control signal for focusing said apparatus on the object;

storage means for storing the signal from said first image detecting means;

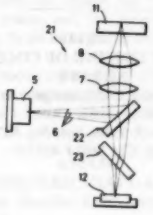
discriminating means for discriminating the shaking of the image in accordance with the signal stored in said storage means and a new output signal from said first image detecting means; and

control means for controlling said discriminating means to start to discriminate the shaking of the image after said signal processing means produces said focus control signal.

4,709,139
COMA CORRECTION IN OPTICAL HEAD WITH ASTIGMATISM FOR FOCUSING ERROR DETECTION

Akira Nakamura, Kanagawa; Hiroshi Oinoue, Tokyo; Tomoyuki Ishida, Tokyo, and Kenji Shintani, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 3, 1986, Ser. No. 847,460
Claims priority, application Japan, Apr. 9, 1985, 60-75059
Int. Cl.[4] G11B *21/10*; G01J *1/20*
U.S. Cl. 250—201 5 Claims



1. In an optical head with astigmatism for focusing error detection and which directs a beam from a light source to be incident on an optical recording medium through a collimator lens and an objective lens, and further directs the beam from said optical recording medium to be incident on a photodetector through said objective lens and said collimator lens; the improvement comprising:

a plate-like half mirror arranged so that the beam from said light source is reflected by said half mirror and guided thereby onto said collimator lens, and the beam which returns from said optical recording medium passes from said collimator lens through said half mirror to produce said astigmatism for focusing error detection and is then incident on said photodetector; and

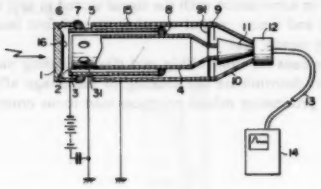
a parallel-surface glass plate interposed in the path of the beam between said half mirror and said photodetector, said half mirror and parallel-surface glass plate being disposed in respective planes which intersect each other so that said parallel-surface glass plate increases said astigmatism and eliminates a coma arising from said half mirror.

4,709,140

HIGH SPEED LIGHT DETECTION TUBE

Koichiro Oba, Hamamatsu, Japan, assignor to Hamamatsu Photonics Kabushiki Kaisha, Hamamatsu, Japan

Filed Jul. 17, 1986, Ser. No. 886,440
Claims priority, application Japan, Oct. 18, 1985, 60-232745
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—207 **3 Claims**



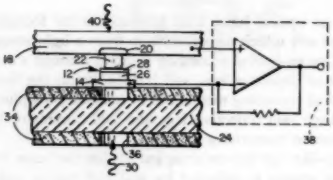
1. A high speed light detection tube comprising of:
a planar photoelectron source of transmission type,
a photoelectron collection electrode arranged in parallel with said photoelectron source, and
an acceleration electrode of transmission type arranged in parallel with said photoelectron source in a space between said photoelectron source and said photoelectron collection electrode;
wherein said photoelectron collection electrode and said acceleration electrode of transmission type are kept at a substantially equal potential, and
a potential to accelerate the photoelectrons passing through said space is applied to said acceleration electrode of transmission type with respect to said planar photoelectron source so that the photoelectrons passing through said acceleration electrode of transmission type can be incident on said photoelectron collection electrode at a substantially constant speed.

4,709,141

NON-DESTRUCTIVE TESTING OF COOLED DETECTOR ARRAYS

David E. Olsen, Calabasas, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 9, 1986, Ser. No. 817,307
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—211 R **18 Claims**



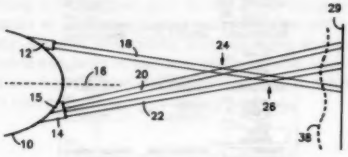
1. An apparatus for testing an array of infrared detectors, comprising:
a plurality of optical switches, each of which is individually addressable with light to change its electrical characteristics, wherein each of said optical switches has a first side and a second side, and wherein said first side of each of said optical switches is adapted to receive a detector of said array to be tested;
an electrode coupled to said second side of each of said optical switches; and
a detector circuit coupled to said electrode and to a probe adapted to be coupled to said array of detectors, said circuit for detecting changes in the electrical characteristics of an addressed optical switch and the infrared detector associated with said addressed optical switch.

4,709,142

TARGET DETECTION IN AEROSOLS USING ACTIVE OPTICAL SENSORS AND METHOD OF USE THEREOF

Randy L. Dahl, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 2, 1986, Ser. No. 914,696
Int. Cl.[4] G01V *9/04*
U.S. Cl. 250—221 **3 Claims**



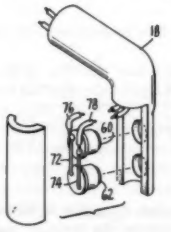
1. An active optical sensing device comprising:
a transmitter for transmitting directional electro-magnetic radiation;
first and second receiving devices with non-overlapping directional fields of view, for receiving directional reflected radiation of said electro-magnetic radiation in a series, and for providing first and second individual output signals in response thereto; and
logic means for processing said first and second signals including determining a time of increase above a threshold of the second signal and a time of decrease below the threshold of the first signal, and comparing the determined times to differentiate between a target and an aerosol in accordance with the following, when the time of increase above the threshold of the second signal occurs after the time of decrease below the threshold of the first signal the first and second signals are reflected from a solid target and when the time of increase above the threshold of the second signal occurs before the time of decrease below the threshold of the first signal the first and second signals are reflected from an aerosol, and to initiate a function sequence.

4,709,143

PHOTOELECTRIC BIN LEVEL SENSOR AND METHOD OF INSTALLING THE SAME

Edwin L. Henderson, 53 Betty St., Ukiah, Calif. 95482

Filed Aug. 22, 1985, Ser. No. 768,553
Int. Cl.[4] G01V *9/04*
U.S. Cl. 250—222.1 **7 Claims**



1. A bin level sensor for particulate material, comprising:
a housing;
a source probe projecting from a face of said housing;

a detector probe projecting from said face of said housing;

each of said probes comprising an inner portion adjacent to said face and substantially perpendicular thereto and an outer portion remote from said face which subtends an angle of between 85 degrees and 135 degrees with its associated inner portion, resulting in probes pointing substantially downward;

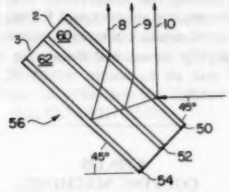
each of said probes being located closely adjacent to the lower edge of said face so as to make possible the insertion of said probes through two holes in the wall of a bin.

4,709,144

COLOR IMAGER UTILIZING NOVEL TRICHROMATIC BEAMSPLITTER AND PHOTOSENSOR

Kent D. Vincent, Cupertino, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 2, 1986, Ser. No. 847,382
Int. Cl.[4] G01J 3/50; H01J 5/16
U.S. Cl. 250—226 **45 Claims**



1. An apparatus for separating electromagnetic waves having wavelengths comprising:

a first transparent layer;

a first filter contiguous with the first side of said first transparent layer for reflecting said electromagnetic waves having said wavelengths within a first range;

a second filter contiguous with the second side of said first first transparent layer for reflecting said electromagnetic waves having said wavelengths within a second range;

a second transparent layer attached to said second filter; and

a third filter contiguous with said second transparent layer for reflecting said electromagnetic waves having said wavelengths within a third range.

4,709,145

METHOD AND APPARATUS FOR COMPENSATING FIBER OPTIC LEAD AND CONNECTOR LOSSES IN A FIBER OPTIC SENSOR BY USING A DUAL WAVELENGTH OPTICAL SOURCE AND MATCHED POLARIZER

William B. Spillman, Jr., Charlotte, Vt., assignor to Simmonds Precision Products, Inc., Tarrytown, N.Y.

Filed Aug. 20, 1986, Ser. No. 898,317
Int. Cl.[4] H01J 5/16
U.S. Cl. 250—227 **26 Claims**

1. Optical sensor apparatus, comprising:

means for providing a source light beam including a first component having a first wavelength and a second component having a second wavelength;

polarizer means for receiving said source light beam, and for polarizing said first component while leaving said second component substantially unpolarized, and for providing a light beam having polarized and unpolarized components;

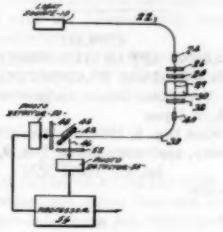
optical transducer means for receiving said light beam from said polarizer means, and for modulating said polarized component in response to an externally applied condition while leaving said unpolarized component substantially unmodulated, and for providing an output light beam having modulated and unmodulated components;

analyzer means for receiving said output light beam from said optical transducer means, and for providing an analyzed light beam having a plurality of modulated and unmodulated intensities corresponding to said modulated and unmodulated components, respectively;

a single first light guiding means for transmitting said analyzed light beam;

beam splitter means for receiving said analyzed light beam from said single first light guiding means, and for splitting said analyzed light beam into first and second portions, each portion including said modulated and said unmodulated light intensities;

first filter means for receiving said first portion, and for transmitting said modulated light intensity while substantially blocking said unmodulated light intensity, and for providing a first filtered light beam having said modulated light intensity;



second filter means for receiving said second portion, and for transmitting said unmodulated light intensity while substantially blocking said modulated light intensity, and for providing a second filtered light beam having said unmodulated light intensity;

first photo detector means for receiving said first filtered light beam, and for providing a first signal corresponding to an intensity of said first filtered light beam;

second photo detector means for receiving said second filtered light beam, and for providing a second signal corresponding to an intensity of said second filtered light beam; and

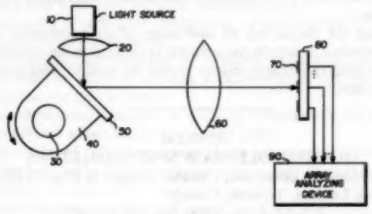
ratio means for receiving said first and second signals, and for providing an output signal corresponding to a ratio of said first signal to said second signal.

4,709,146

OPTICALLY COUPLED SHAFT ANGLE ENCODER

Harold J. Reitsema, Boulder, Colo., assignor to Ball Corporation, Muncie, Ind.

Filed Oct. 2, 1984, Ser. No. 656,925
Int. Cl.[4] G01D 5/34
U.S. Cl. 250—231 SE **15 Claims**



1. An optically coupled shaft angle encoder for measuring the rotational angle of a rotatable shaft, said encoder comprising:

light source means with respect to which said shaft is also rotatable for generating light;

reflecting means mounted on said shaft for receiving and reflecting said light therefrom;

a linear array of photosensitive detectors fixedly mounted with respect to said light source means and disposed to receive said reflected light from said reflecting means, each detector providing a separate electrical output signal, wherein at least one but not all photosensitive detectors of said linear array receives said reflected light at a position along said linear array which depends on the relative angular position of said shaft; and

an optical means, positioned between said light source and said reflecting means, for collimating light received from said light source before it is passed on to said reflecting means and said optical means also being positioned between said reflecting means and said array of photosensitive detectors, for focussing collimated light received from said relecting means onto said array.

4,709,147

IMAGE READING APPARATUS WHICH CALCULATES AN ORIGINAL READING DOMAIN

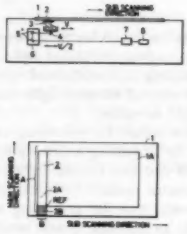
Hitoshi Arai, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 5, 1984, Ser. No. 678,591

Claims priority, application Japan, Dec. 9, 1983, 58-231452

Int. Cl.[4] H01J *5/16*

U.S. Cl. 250—234 **8 Claims**



1. An image reading apparatus comprising:

means for reading an image of an original by scanning the original;

an indication member for indicating a reading reference position of said reading means along a main scanning direction;

means for detecting the reading reference position by reading said indication member with said reading means;

means for calculating an original reading domain of said reading means in accordance with a detection output from said detecting means and a size of an original to be read;

control means for controlling an output from said reading means when reading the image of the original, in accordance with a calculation result of said calculating means; and

means for displaying an indication of an occurrence of a situation in which the original reading domain calculated by said calculating means cannot be read by said reading means.

4,709,148

QUADRUPOLE MASS SPECTROMETERS

Basil Meddings, Edmonton, Canada, assignor to Sherritt Gordon Mines Limited, Toronto, Canada

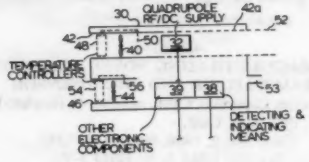
Filed Jan. 31, 1986, Ser. No. 824,823

Claims priority, application United Kingdom, Feb. 7, 1985, 8503125

Int. Cl.[4] B01D *59/44*

U.S. Cl. 250—292 **5 Claims**

1. A quadrupole mass spectrometer comprising a housing containing pole rods defining a passage through which ions can pass when the housing is evacuated, means for applying ions to said passage, RF voltage supply means for supplying RF voltage to said pole rods to cause ions only of a predetermined mass/charge ratio to pass through said passage, means for receiving ions which have passed through said passage, electrical means for detecting and indicating the rate of receipt of ions of said predetermined mass/charge ratio by said ions



receiving means, and means for controlling the termperature of said RF supply means, said temperature control means comprising means for passing air over said RF supply means, said temperature control means comprising means for passing air over said RF supply means and means for maintaining the temperature of said air to within ±0.05° C. of a specified temperature.

4,709,149

COPYING MACHINE

Haruhiko Takahashi; Toshiharu Inui; Hiroyuki Saitoh; Noriyoshi Ishikawa; Hitoshi Funato; Takashi Ohmori; Masami Kurata, and Yasuo Katou, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

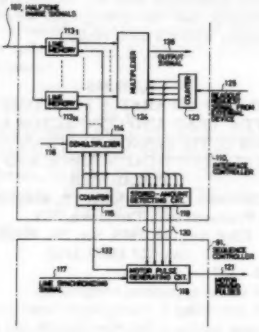
Filed Aug. 6, 1985, Ser. No. 762,866

Claims priority, application Japan, Aug. 7, 1984, 59-164324

The portion of the term of this patent subsequent to Apr. 28, 2004, has been disclaimed.

Int. Cl.[4] G03C *5/16*

U.S. Cl. 250—317.1 **6 Claims**



1. A copying machine capable of producing a copy from an original to be copied comprising:

(a) platen means for supporting the original to be copied;

(b) scanner unit means reciprocally movable relative to said platen means in an auxiliary scanning direction for reading a series of lines on the original and for generating an image signal for each said line;

(c) thermal head means having a heating region with heating body units for selectively generating thermal pulses in response to the image signals from said scanner unit means;

(d) means for supplying said thermal head means with an ink

donor sheet coated with thermally transferable ink, said ink becoming fluidized or sublimated when heated;

(e) means for supplying a recording sheet in the vicinity of said thermal head means;

(f) means for bringing the recording sheet into intimate contact with said heating region of said thermal head means and for interposing the ink donor sheet between the recording sheet and the heating region to record an image on the recording sheet.

(g) means for separating the ink donor sheet from the recording sheet and for discharging the recording sheet after the image has been recorded on the recording sheet;

(h) buffer means for temporarily storing the image signal from said scanner unit means; and

(i) means responsive to the number of image signals stored in said buffer memory means, for controlling the speed of movement of said scanner unit relative to said platen in the auxiliary scanning direction when the original is read.

4,709,150

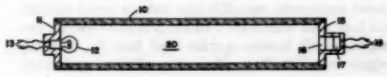
METHOD AND APPARATUS FOR DETECTING GAS

Irvin G. Burough, 1656 Camino Verde, Walnut Creek, Calif. 94596; Robert O. Pellissier, 3990 Salvador Ct., Pleasanton, Calif. 94566, and Kenneth W. Johnson, 4078 Laguna Way, Palo Alto, Calif. 94306

Filed Mar. 18, 1986, Ser. No. 840,929

Int. Cl.[4] G01N *21/35*

U.S. Cl. 250—338 **19 Claims**



1. A cell for use in an analyzer for a gas comprising:

a hollow, porous, support element exposed directly to ambient air and enclosing an elongated column of air at ambient pressure into which ambient air may diffuse,

a source of radiant energy positioned within said porous element at one end of said column and sealed within said porous element,

a detector for said radiant energy sealed within said porous element and positioned at the end of said column opposite said source and to receive radiation from said source,

an optical filter positioned between said source and said detector, said optical filter passing only radiation from said source that is strongly absorbed by said gas.

4,709,151

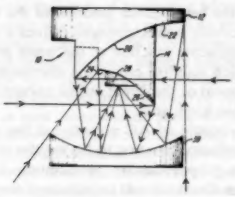
STEERABLE MIRROR ASSEMBLY AND COOPERATIVE HOUSING FOR A PASSIVE INFRARED INTRUSION DETECTION SYSTEM

John K. Guscott, Lynnfield, and George Vulgaris, Sharon, both of Mass., assignors to ADT, Inc., Parsippany, N.J.

Filed Oct. 23, 1985, Ser. No. 790,462

Int. Cl.[4] G01J *5/08*

U.S. Cl. 250—342 **8 Claims**



1. A ceiling mountable passive infrared intrusion detection system, comprising:

a first mirror for focusing radiation incident thereon at a focus;

a second mirror for providing a curtain-like first field of view that has nominal range, a comparatively narrow azimuthal extent, and a comparatively wide elevational extent, and cooperative with the first mirror for directing the radiation present in the first field of view onto the focus;

a third mirror for providing a curtain-like second field of view that has a nominal range, a comparatively narrow azimuthal extent, and a comparatively wide elevational extent, and cooperative with the first mirror for directing the radiation present in the second field of view onto the focus;

means coupled to said second and said third mirrors for mounting said second and said third mirrors for relative rotation about a common axis such that said first and said second fields of view are independently steerable and substantially non-interfering; and

an infrared detector positioned at the focus of the first mirror and operative in response to the radiation focused thereat to provide an electrical signal representative of intruder presence.

4,709,152

INFRARED INTRUSION DETECTOR

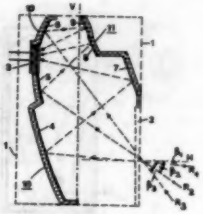
Kurt Müller; Peter Gruber, and Alfred Wüthrich, all of Stäfa, Switzerland, assignors to Cerberus AG, Männedorf, Switzerland

Filed Jan. 13, 1986, Ser. No. 818,491

Claims priority, application Switzerland, Jan. 24, 1985, 306/85

Int. Cl.[4] G01J *5/08*

U.S. Cl. 250—342 **17 Claims**



1. An infrared intrusion detector having a predetermined number of radiation reception zones, comprising:

an infrared radiation sensor;

a plurality of reflectors for focusing infrared radiation arriving from said predetermined number of radiation reception zones onto said infrared radiation sensor;

said plurality of reflectors comprising a predetermined number of primary reflectors;

said predetermined number of primary reflectors corresponding in number to said predetermined number of radiation reception zones;

said predetermined number of primary reflectors forming a plurality of substantially horizontal rows;

said plurality of reflectors comprising at least one common secondary reflector associated with each row of said plurality of rows of primary reflectors;

said predetermined number of primary reflectors and said at least one common secondary reflector cooperating for focusing said infrared radiation arriving from said predetermined number of radiation reception zones through at least one folded radiation path onto said infrared radiation sensor;

each row of said plurality of rows of primary reflectors conjointly with said therewith associated at least one

common secondary reflector defining a respective radiation reception zone group of said predetermined number of radiation reception zones;

each said radiation reception zone group having a different angle of inclination relative to a substantially horizontal plane;

at least one reflector of said primary reflectors and said at least one common secondary reflector associated with each said radiation reception zone being arranged at least approximately in a first substantially vertical plane;

at least one other reflector of said primary reflectors and said at least one common secondary reflector associated with each said radiation reception zone being arranged in a predetermined spaced relationship to said at least one reflector;

said at least one common secondary reflector comprising a plurality of secondary reflectors;

each row of said primary reflectors and an associated one of said plurality of secondary reflectors of a respective radiation reception zone group having a predetermined focal length; and

the predetermined focal length of each respective radiation reception zone group of said predetermined number of radiation reception zones decreasing as said angle of inclination relative to said substantially horizontal plane increases.

4,709,153

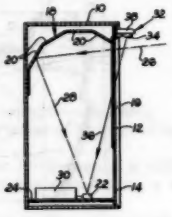
INTRUDER DETECTOR

Roy A. Schofield, Darwen, England, assignor to Shorrock Security Systems Limited, Blackburn, England

Filed Jun. 6, 1985, Ser. No. 741,818

Int. Cl.[4] G01J 5/04

U.S. Cl. 250—353 **1 Claim**



1. An infra-red intrusion detector for monitoring any unwanted disarming thereof and/or any approach of an intruder into the monitored area comprising:

a housing having an infra-red transparent window for the passage therethrough of infra-red radiation into the housing interior,

an infra-red radiation detector within the housing,

an optical means within the housing for providing an incidental output onto the detector by focussing the infra-red radiation arising from the approach of the intruder

a modulated infra-red radiation generator means mounted externally of the housing for directing radiation through the window and for providing a normal recognizable radiation output onto the detector,

signal processing means for monitoring the normal recognizable and incidental outputs on the detector insuring against disablement by any rendering of the window opaque to infra-red and for generating a signal in the event of the normal recognizable output from the detector falling below a pre-set value due to insufficient radiation reaching the detector from the modulated radiation generator and/or a change in the radiation reaching the detector commensurate with the approach of the intruder.

4,709,154

OPTO-ELECTRICAL SIGNAL CONVERTER WITH STABILIZATION

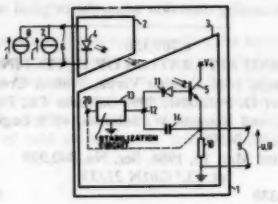
Gerrit Rademaker, and Franciscus A. A. van der Veer, both of Hilversum, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 19, 1985, Ser. No. 767,305

Claims priority, application Netherlands, Aug. 20, 1984, 8402544

Int. Cl.[4] G02B 27/00

U.S. Cl. 250—551 **9 Claims**



1. In an opto-electrical signal converter for linearly converting an input signal which consists of an alternating current component superimposed on a direct current component into an output signal which consists of an alternating voltage component superimposed on a direct voltage component, of the type comprising a light transmitter which emits light corresponding to the input signal and a light receiver which responds to the light produced by the transmitter, the improvement wherein the light receiver comprises:

a bipolar junction transistor, the collector of the transistor being connected to a potential source;

photosensitive means which produce a current at the base of the transistor which corresponds to the light emitted by the transmitter;

a first resistor connected from the emitter of the transistor to a point of common potential so that an output current consisting of alternating output current component superimposed on a direct output current component flows through the potential source, the collector-emitter path of the transistor, and the point of common potential;

a semiconductor junction, a first side of which is connected to the base of the transistor so that the semiconductor junction, viewed from the base of the transistor, is connected to the photosensitive means in the same conductive sense as is the base-emitter junction of the transistor;

stabilization circuit means, connected from a second side of the semiconductor junction to the point of common potential, which stabilize either the alternating output current component or the direct output current component at an adjustable level; and

means which couple an AC potential at the second side of the semiconductor junction to the emitter of the transistor whereby a proportionality is maintained between the transmission direct current resistance of the transistor and the transmission alternating current resistance of the transistor.

4,709,155

FLAME DETECTOR FOR USE WITH A BURNER

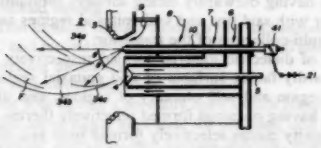
Tetsurou Yamaguchi; Kohji Yamamoto, and Kiichiro Honda, all of Kure, Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 20, 1985, Ser. No. 800,178

Claims priority, application Japan, Nov. 22, 1984, 59-246344; Nov. 30, 1984, 59-251670; Nov. 30, 1984, 59-251671; Dec. 12, 1984, 59-260932

Int. Cl.[4] G08B 17/12

U.S. Cl. 250—554 16 Claims



1. Apparatus for detecting flame for use with a burner, comprising:

(a) a light-taking head having a fiber supporting member, a plurality of light-taking optical fibers supported by said fiber supporting member so that respective front ends of said light-taking optical fibers have different directions of fields of vision, and a protecting pipe for receiving said light-taking fibers, said fiber supporting member having means for guiding front end portions of said light-taking optical fibers so that said different directions have different angles with respect to a reference line, said front end portions of said light-taking optical fibers respectively extending radially outwardly with different angles from said reference line;

(b) photosensitive element means responsive to optical signals fed from said light-taking optical fibers for converting said optical signals into electrical signals, said photosensitive element means having a plurality of pairs of photosensitive elements where the number of the pairs equals the number of said plurality of light-taking optical fibers, said photosensitive elements in each pair having different sensitive wavelength ranges;

(c) a plurality of optical fibers for transmitting said optical signals from said light-taking head to said photosensitive elements, said plurality of optical fibers being respectively connected to said plurality of light-taking optical fibers; and

(d) a flame detecting unit responsive to said electrical signals.

4,709,156

METHOD AND APPARATUS FOR INSPECTING A SURFACE

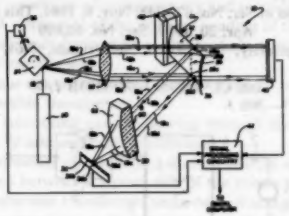
Stephan D. Murphy, Danville, Pa., and Thomas Derkacs, Cleveland, Ohio, assignors to Ex-Cell-O Corporation, Troy, Mich.

Filed Nov. 27, 1985, Ser. No. 802,700

Int. Cl.[4] G01B 11/24

U.S. Cl. 250—560 9 Claims

1. A method of inspecting a curved surface on an article, said method comprising the steps of impinging beams of light in a predetermined order against each point in an arcuate series of points on a stationary curved surface by projecting the beams of light in a predetermined order along a plurality of parallel first paths which are offset in a first direction by a known distance, reflecting light beams from each of the points in the series of points in turn along second paths which are offset in the first direction by an amount corresponding to the distance which the first paths are offset in the first direction and which are offset in a second direction transverse to the first direction by an amount corresponding to the distance which the points in the series of points are offset due to curvature of the surface of the article, and eliminating the offset in the first direction between the reflected light beams and maintaining the offset in the second direction between the reflected light beams by sequentially focusing the reflected light beams on a linear detector with the distance between locations at which the



reflected light beams are focused on the linear detector corresponding to the distance which the points on the surface in the series of points are offset due to curvature of the surface of the article.

4,709,157

METHOD AND APPARATUS FOR INSPECTING WEB SURFACE

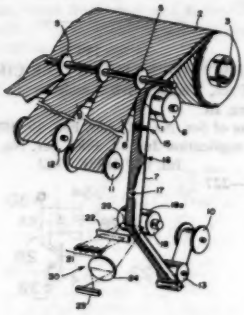
Shigehisa Shimizu, and Takao Otokozawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 13, 1985, Ser. No. 765,116

Claims priority, application Japan, Aug. 13, 1984, 59-167904

Int. Cl.[4] G01N 21/88

U.S. Cl. 250—572 14 Claims



1. A method for inspecting a photosensitive layer on a web whose lateral margins are slit away as said web is moved lengthwise, comprising:

projecting a line of illumination across the width of at least one of said lateral margins being slit away from said web, the intensity of said illumination being modulated by contact with said at least one lateral margin to an extent that varies with the presence or absence of a defect on the illuminated margin;

producing an analog video signal in accordance with the modulated intensity of said illumination;

converting said analog video signal into two binary signals of square wave form of high and low output levels;

discriminating a combination of said two binary signals for detecting the presence of a defect on said at least one lateral margin; and

producing a defect signal when the presence of a defect is thus detected.

4,709,158

ARRANGEMENT FOR RESTORING THE L.F. CONTENT OF A DIGITAL SIGNAL

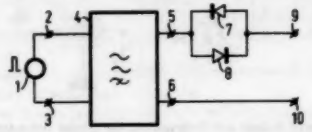
Petrus C. M. Almering, and Bocke Zwaga, both of Hilversum, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 670,248, Nov. 9, 1984. This application Apr. 20, 1987, Ser. No. 40,699

Claims priority, application Netherlands, Nov. 15, 1983, 8303907

Int. Cl.[4] H03K *5/01*; H03B *1/00*

U.S. Cl. 307—200 A **3 Claims**



1. In a system for locating faults in a transmission line having a repeater, said repeater including:
   - a transformer with a primary winding connection to receive a digital triplet test signal or an information signal;
   - a first secondary winding for coupling said information signal to a transmission line;
   - a second secondary winding serving as a high pass filter to said test signal;
   - a circuit for restoring low frequency signal components to said triplet test signal comprising:
   - a center clipper connected to said second secondary winding; and
   - a low pass filter connected to said center clipper providing a restored triplet test signal indicative of said repeater performance.

4,709,159

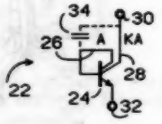
CAPACITANCE MULTIPLIER CIRCUIT

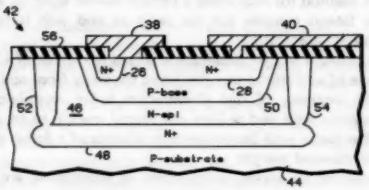
Wilson D. Pace, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 122,629, Feb. 19, 1980, abandoned. This application Jul. 23, 1981, Ser. No. 286,119

Int. Cl.[4] H03K *4/02*

U.S. Cl. 307—227 **3 Claims**





1. A merged integrated vertical NPN transistor-capacitor structure, comprising:
   - an integrated circuit substrate, said substrate being formed of a semiconductor material of a first conductivity type;
   - an epitaxial region formed on said substrate having a substantially planar outwardly facing surface, said epitaxial region being formed of a semiconductor material of a second conductivity type and being the emitter of the transistor;
   - a first region formed within said epitaxial region having an outwardly facing surface substantially coplanar with said surface of said epitaxial region, said first region being formed of semiconductor material of said first conductivity type and being the base of the transistor;
   - a plurality of regions of said semiconductor material of said second conductivity type formed in said first region in spaced relationship to one another, said plurality of regions having outwardly facing surfaces substantially coplanar with said first and said epitaxial regions and forming multi-collectors of the transistor;
   - a layer of dielectric material formed respectively on said outwardly facing surfaces of said epitaxial regions, said first region and said plurality of regions, said dielectric layer having openings formed selectively therein;
   - conductivity means selectively formed over said dielectric layer for electrically shorting said first region to a first one of said plurality of regions; and
   - a second one of said plurality of regions having a surface area equal to a constant K times the area of a first one of said plurality of regions wherein K is greater than 1 which produces an effective capacitance which has a value proportional to (1+K) times the value of the capacitance formed between the junction of said second one of said plurality of regions with said first regions.

4,709,160

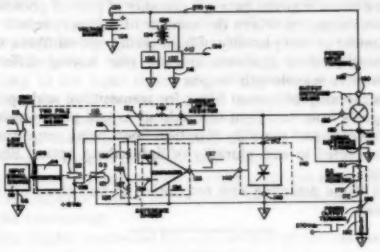
SOLID STATE DC POWER SWITCH

Roy Y. Kinoshita, Anaheim, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 25, 1986, Ser. No. 900,213

Int. Cl.[4] H03K *17/08, 17/56, 17/60, 17/687*

U.S. Cl. 307—253 **12 Claims**



1. A dc power switch having an input signal terminal coupled to an
   - input signal source, said input signal source providing an input signal voltage with respect to
   - a signal reference terminal, said input signal having a high state and a low state, said dc power switch having
   - a power input terminal connected to
   - a dc voltage source and
   - a power output terminal connected to
   - a load, said dc voltage source having a power return terminal coupled to receive current from said load;
   - said dc power switch comprising:
     - at least one isolated voltage sorce, said isolated voltage source being referenced to said signal reference terminal;
     - an output switching means having a conduction channel having a first and second terminal and a control terminal, said conduction channel first terminal being coupled to said voltage source, said output switching means conduction channel second terminal being coupled to

said signal reference terminal, said output switching means being responsive to a control signal high state applied to said control terminal for coupling current from said dc voltage source to said signal reference terminal in response to a control signal high state applied to its control terminal;

a sense resistor having a first and second terminal, said sense resistor first terminal being coupled to said signal reference terminal and said sense resistor second terminal being coupled to said power output terminal;

a means for interrupting said dc current to said load in response to said load current exceeding a predetermined threshold having:

a current limiting resistor having a first and second terminal, said second terminal being connected to said output switching means control terminal;

a two pole switching means having:

a first pole having a normally open switch responsive to said input signal high state for coupling said isolated voltage source to said current limiting resistor first terminal, the voltage at said current limiting resistor second terminal representing a control signal high state in response to closure of said normally open switch, and

a second pole having a normally closed switch responsive to said input signal high state, for disconnecting said current limiting resistor second terminal from said power output terminal in response to said input signal high state;

means for latching into a tripped state to interrupt said dc current to said load in response to said load current exceeding a predetermined threshold by shunting said current limiting resistor second terminal to said power output terminal to remove said control signal high state from said output switching means control terminal and for automatically resetting from said tripped state upon reducing said load current to a value less than said predetermined threshold and upon removing said input signal high state.

4,709,161

TRANSISTOR DRIVE CIRCUIT

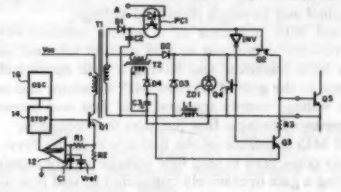
Fumio Mizohata, and Shigetada Goto, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 28, 1986, Ser. No. 845,257

Claims priority, application Japan, Mar. 29, 1985, 60-66036; Mar. 29, 1985, 60-66037

Int. Cl.[4] H03K *3/26, 3/33;* **G05F** *1/40*

U.S. Cl. 307—270 **7 Claims**



1. A circuit arrangement for driving a main transistor comprising:

a first transformer having primary and secondary windings;

a first transistor connected in series with the primary winding of said first transformer for controlling a current flowing through the primary winding of said transformer;

means for detecting the value of the current flowing through the primary winding of said first transformer;

comparison means responsive to the detected current value for producing an output when the current value detected by said current detecting means exceeds a predetermined value;

cut-off means connected to the comparison means for rendering said first transistor in a cut-off state during the output of said comparison means;

a saturable transformer having primary and secondary windings with a first side of the primary winding of the saturable transformer connected to the secondary winding of said first transformer;

a reverse bias circuit connected to the secondary winding of said saturable transformer;

means for smoothing current flowing through the primary winding of said saturable transformer;

a second transistor operated by a turn-on control signal and connected between a second side of the primary winding of said saturable transformer and a base of said main transistor for supplying a turn-on current to the base of said main transistor during the turn-on control signal;

a third transistor operated by a turn-off control signal and connected between said reverse bias circuit and the base of said main transistor for supplying a turn-off current form said reverse bias circuit to the base of said main transistor during the turn-off control signal; and

a fourth transistor operated by the turn-off control signal and connected between the second side of the primary winding of the saturable transformer and a common line for shunting the output current of the primary winding of said saturable transformer to the common line in response to said turn-off control signal.

4,709,162

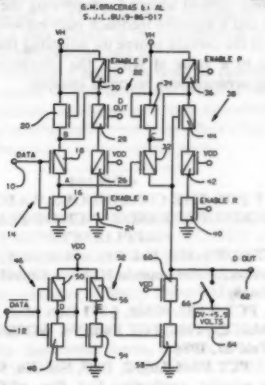
OFF-CHIP DRIVER CIRCUITS

George M. Braceras, South Burlington, and Jeffrey H. Dreibelbis, Williston, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 18, 1986, Ser. No. 908,849

Int. Cl.[4] H03K *19/003, 19/094*

U.S. Cl. 307—270 **17 Claims**



1. An off-chip driver circuit comprising

a voltage supply source terminal having a given voltage applied thereto,

an output terminal,

a pull-up device disposed between said voltage supply source terminal and said output terminal,

a voltage dropping diode disposed between said voltage supply source terminal and said pull-up device, and

means for limiting the voltage at the common point between said voltage dropping diode and said pull-up device.

4,709,163

CURRENT-DISCRIMINATION ARRANGEMENT

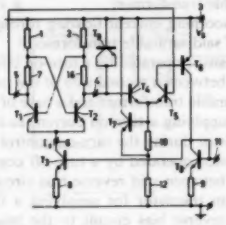
Wolfdietrich G. Kasperkovitz, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 16, 1983, Ser. No. 469,544

Claims priority, application Netherlands, Mar. 10, 1982, 8200974

Int. Cl.[4] H03K 3/01, 3/29

U.S. Cl. 307—297 6 Claims



1. A current stabilizing arrangement comprising a first transistor and a second transistor, each having a base electrode, an emitter electrode and a collector electrode, the collector electrode of the first transistor being connected to a first point by a first resistor and the collector electrode of the second transistor being connected to said first point by a second resistor of substantially the same value as the first resistor, the base electrode of the first transistor being connected to a point between the second resistor and the collector electrode of the second transistor, and the base electrode of the second transistor being connected to a point between the first resistor and the collector electrode of the first transistor, the emitter electrodes of the first and second transistors being connected to a second point, the circuit between the first point and the second point being arranged in series with an input for receiving an input current and an output being coupled to at least one of the two collector electrodes, characterized in that the arrangement comprises a controllable current source for supplying the input current to the input and a negative feedback path between the output and an input of the current source for adjusting the input current to the input to a value at which the operation of the current stabilizing arrangement becomes bistable.

4,709,164

CIRCUIT FOR THE CONTINUOUS WATCHING OF THE GROUNDING RESISTANCE OF ELECTRICAL APPLIANCES

Johann Giesl, Pfreimd, Fed. Rep. of Germany, assignor to Elektromanufaktur Zangenstein Hanauer GmbH & Co., Fed. Rep. of Germany

PCT No. PCT/EP85/00388, § 371 Date Mar. 25, 1986, § 102(e) Date Mar. 25, 1986, PCT Pub. No. WO86/01299, PCT Pub. Date Feb. 27, 1986

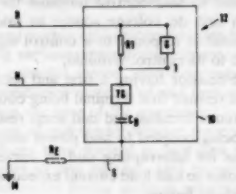
PCT Filed Aug. 2, 1985, Ser. No. 849,498

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1984, 3429067

Int. Cl.[4] H02H 3/16; G08B 21/00

U.S. Cl. 307—326 21 Claims

1. A circuit for the continuous watching of the grounding resistance of an electrical appliance having a casing, a protecting conductor and a live lead, the electrically conductive parts of which that may be touched, including the casing of the appliance being connected to a ground potential by said protecting conductor, comprising a series connection connecting said live lead to said protecting conductor and including at least one precision resistor for measuring purposes, one test pulse generator providing pulses with a pulse rise time, and one



capacitor connected to said precision resistor providing a time constant greater than said pulse rise time.

4,709,165

VOLTAGE SUPPLY LEVEL DETECTING CIRCUIT

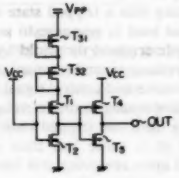
Mitsuo Higuchi, Tokyo, and Manabu Tsuchida, Yokohama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 841,051, Mar. 17, 1986, abandoned, which is a continuation of Ser. No. 490,185, Apr. 29, 1983, abandoned. This application Dec. 24, 1986, Ser. No. 946,173

Claims priority, application Japan, Apr. 30, 1982, 57-72912

Int. Cl.[4] H03K 5/153

U.S. Cl. 307—350 6 Claims



1. A voltage supply level detecting circuit, comprising:

a first voltage supply terminal for receiving a fixed voltage level;

a second voltage supply terminal for receiving a variable voltage level having a first voltage level higher than the fixed voltage level and a second voltage level lower than the first voltage level;

a ground terminal;

a first MIS transistor of a first conductivity type, operatively connected to said second voltage supply terminal, having a gate operatively connected to said first voltage supply terminal and having a threshold voltage;

a second MIS transistor of a second conductivity type, operatively connected to said ground terminal and said first MIS transistor and having a gate operatively connected to the gate of said first MIS transistor and said first first voltage supply terminal, said first and second MIS transistors having a first junction therebetween;

a third MIS transistor of the first conductivity type, operatively connected to said first voltage supply terminal and having a gate operatively connected to said first junction;

a fourth MIS transistor of the second conductivity type, operatively connected to said ground terminal and said third MIS transistor and having a gate operatively connected to the gate of said third MIS transistor and the first junction, said third and fourth MIS transistors having a second junction therebetween;

level shift means, operatively connected between said second voltage supply terminal and said first MIS transistor, for providing said first MIS transistor with a third voltage level higher than the fixed voltage level plus the threshold voltage of said first MIS transistor when the first voltage level is applied to said second voltage supply terminal and

for providing said first MIS transistor with a fourth voltage level lower than the fixed voltage level when said second voltage level is applied, said first and second MIS transistors and said level shift means having conductances such that the first junction provides a fifth voltage level higher than the fixed voltage level when the first voltage level is applied to the second voltage supply terminal, thereby turning OFF said third MIS transistor; and

an output terminal, operatively connected to the second junction, for outputting a signal indicating whether the first voltage level or the second voltage level is received by said second voltage supply terminal.

4,709,166

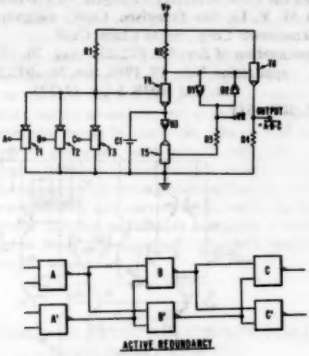
COMPLEMENTARY CASCODED LOGIC CIRCUIT

Dennis C. Banker, Newburgh; Jack A. Dorler, Holmes, and John N. Hryckowian, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 22, 1986, Ser. No. 865,700

Int. Cl.[4] G06F *11/16, 7/34;* H03K *19/003, 19/088*

U.S. Cl. 307—441 **17 Claims**



12. A high switching speed low power logical circuit for performing a logical function, said logical circuit comprising:

input circuit means, said input circuit means including at least first and second input terminals;

output circuit means, said output circuit means including an output terminal; and,

circuit means coupling said input circuit means to said output circuit means, said logic circuit being characterized in that said circuit means coupling said input circuit means to said output circuit means includes an active current source means consisting essentially of the serial interconnection of a diode and an inversely operated transistor.

4,709,167

THREE-STATE OUTPUT BUFFER WITH ANTI-SATURATION CONTROL

Adrian P. Brokaw, Burlington, Mass., assignor to Analog Devices, Inc., Norwood, Mass.

Filed Aug. 16, 1982, Ser. No. 408,480

Int. Cl.[4] H03K *19/013, 19/088*

U.S. Cl. 307—443 **26 Claims**

1. In an electronic component producing a multi-bit digital output to be coupled to a multi-line bus through which digital signals from other devices must also flow, a multi-stage three-state output buffer for coupling said component to said bus wherein each buffer stage comprises:

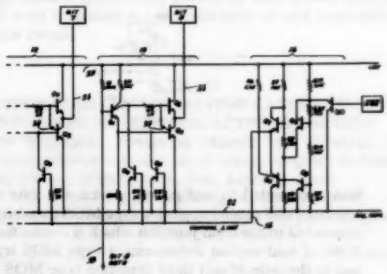
two output transistors having their collector-emitter current paths connected in series between high and low supply potentials;

an output line connected to the common junction between said transistors;

data signal phase-splitting means having an input receiving a corresponding data bit from said component and having first and second outputs producing direct and inverted data signals corresponding to the logic level of said data bit;

means coupling said direct and inverted data signals to the bases of said output transistors respectively to activate one or the other in accordance with the logic level of the data bit developed by said component, thereby to produce a corresponding output bit on said output line;

a common control line for all of said buffer stages and switchable to a predetermined control state providing a command signal for establishing a high-impedance buffer output; and



first and second amplifying control transistors having input means coupled to said control line and having first and second output means respectively connected to said first and second outputs of said phase-splitting means to provide for overriding said data signals in controlling the bases of both of said output transistors;

said cotnrol transistors normally being deactivated and effectively isolated from said output transistors when said command signal is off, so as to permit said output transistors to respond in complementary fashion to said direct and inverted data signals in correspondence to the logic level of said component data bit;

said control transistors being operable in response to said command signal to pull down the bases of both of said output transistors simultaneously so as to override whichever of said data signals is "on" and effect a fast transition to a high impedance buffer output state.

4,709,168

REFERENCE VOLTAGE GENERATING CIRCUIT FOR ENHANCEMENT/DEPLETION MOSFET LOAD CIRCUIT FOR DRIVING LOGIC CIRCUITS

Setsufumi Kamuro, Yamatokoriyama, and Mikiro Okada, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 20, 1985, Ser. No. 767,473

Claims priority, application Japan, Sep. 10, 1984, 59-190258

Int. Cl.[4] H03K *17/16, 19/017, 5/12, 17/687*

U.S. Cl. 307—448 **8 Claims**

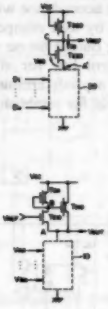
1. A logical circuit system comprising

a logical circuit,

a driving circuit which drives said logical circuit, and

a reference voltage generating circuit which applies to said driving circuit a reference voltage having an appropriate value corresponding to the structure of said logical circuit, said reference voltage generating circuit including a first depletion type MOS transistor of which the gate and the drain are connected to a power source and a first enhancement type MOS transistor of which the gate and

the drain are connected to the source of said first depletion type MOS transistor to form a first junction, said first enhancement type MOS transistor having its source coupled to an inserted circuit said driving circuit including a second enhancement type MOS transistor, having its gate coupled to said first junction, a second depletion type MOS transistor and a third depletion type MOS transistor, the drain of said second depletion type MOS transistor and the drain of said third depletion type MOS transistor



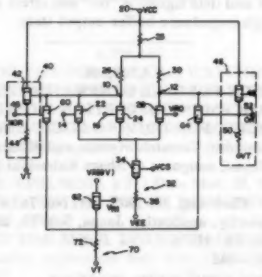
being connected to said power source, the gate and the source of said second depletion type MOS transistor being connected to a second junction which is connected to the drain of said second enhancement type MOS transistor and to the gate of said third depletion type MOS transistor, the source of said second enhancement type MOS transistor and the source of said third depletion type MOS transistor being connected to said logical circuit through a third junction.

4,709,169

LOGIC LEVEL CONTROL FOR CURRENT SWITCH EMITTER FOLLOWER LOGIC

Gerard J. Ashton; Joseph R. Cavaliere, both of Hopewell Junction, and Ming T. Cheng, Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 2, 1986, Ser. No. 902,711
Int. Cl.[4] H03K *19/013, 19/086, 17/10, 19/092*
U.S. Cl. 307—455 **21 Claims**



1. A logic circuit network for producing both a first logic level and a different adjustable second logic level in response to at least one input signal, comprising:

a logic circuit with an output current node, a complement output current node, and at least one input line, said logic circuit for generating an output voltage level at said output current node which depends on the amount of current drawn through said output current node, and for generating a complement output voltage level at said complement output current node which depends on the amount of current drawn through said complement output current node; and

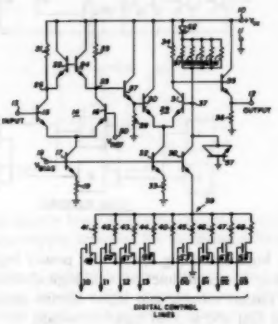
means connected to a voltage reference level V_{R1}, said means for drawing an amount of current from whichever of said output current node or said complement output current node has a voltage level V which is closest to a predetermined constant, plus said voltage reference level V_{R1}, and wherein said amount of current drawn by said current drawing means is sufficient to cause said closest voltage level V to approach said predetermined constant plus said voltage reference level V_{R1}.

4,709,170

SUBNANOSECOND PROGRAMMABLE PHASE SHIFTER FOR A HIGH FREQUENCY DIGITAL PLL

Gabriel M. Y. Li, San Francisco, Calif., assignor to National Semiconductor Corp., Santa Clara, Calif.

Continuation of Ser. No. 642,232, Aug. 20, 1984. This application Nov. 19, 1986, Ser. No. 932,952
Int. Cl.[4] H03K *5/18, 13/175*
U.S. Cl. 307—511 **6 Claims**



1. A programmable clock pulse phase shifter circuit comprising:

integrator means having an input coupled to a source of input clock pulses and functioning to convert said input clock pulses to a ramp signal, said integrator means comprising a first pair of transistors each one having emitter, base and collector electrodes with the bases comprising said input and with the emitters connected together to force said first pair of transistors to operate differentially, a pair of load resistors coupled to the collectors thereof to act as output elements and capacitive means coupled between the collectors of said first pair of transistors;

comparator means having an input coupled to one of the collectors of said first pair of transistors thereby to receive said ramp signal and having a comparison reference voltage whereby said ramp signal is converted into output clock pulses having edges located where a voltage of said ramp signal is equal to said reference voltage; and

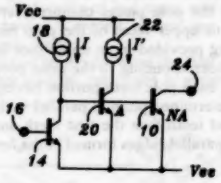
means connected to said comparator for digitally programming said comparison reference voltage whereby said output clock pulse edges can be shifted in time by digital increments to create a variable clock pulse phase shift between said input clock pulses and said output clock pulses.

4,709,171

CURRENT LIMITER AND METHOD FOR LIMITING CURRENT

William E. Main, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 27, 1982, Ser. No. 382,754
Int. Cl.⁴ H03K 17/08
U.S. Cl. 307—567 4 Claims



1. In a monolithic circuit including a first transistor to which base current drive is supplied, a method for limiting the current through the collector-emitter thereof, comprising the steps of:

providing a current source; and

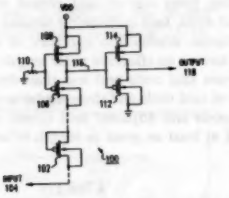
providing a second transistor of like conductivity type as the first transistor having its base and emitter coupled respectively to the base and emitter of the first transistor and its collector coupled to said current source, the emitter of the first transistor being N times the area of said emitter of said second transistor, said second transistor becoming saturated as the base current exceeds a value at which said second transistor requires a greater collector current than can be supplied by said current source wherein the collector current flowing in the first transistor is limited to a value of N times the magnitude of current sourced from said current source.

4,709,172

INPUT-VOLTAGE DETECTOR CIRCUIT FOR CMOS INTEGRATED CIRCUIT

Clark R. Williams, Plano, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.

Filed Aug. 19, 1985, Ser. No. 766,954
Int. Cl.⁴ H03K 5/153, 17/30, 17/284; G11C 8/00
U.S. Cl. 307—585 11 Claims



1. In a CMOS monlithic integrated circuit, an input-voltage detector circuit for increasing the functionality of said integrated circuit without requiring an increase in the number of terminals of said integrated circuit, or, alternatively, for reducing the number of required terminals, said input-voltage detector circuit having a ground node, a positive-voltage power supply node, an output node, and an input node for receiving an input voltage which is more positive than ground by a first predetermined level for a logic 1 input, for receiving an input voltage approximately at ground-voltage potential for a logic 0 input, and for receiving an input voltage which is more negative than ground by a second predetermined level for an alternative-function input signal, comprising:

a. an N-channel enhancement-mode transistor having both its source and P-type substrate region electrically coupled to said input node;

b. an electrically conductive load element coupled between the drain of said N-channel enhancement-mode transistor and said positive-voltage power supply node;

c. means for applying a ground-voltage potential to the gate electrode of said N-channel enhancement-mode transistor;

d. a buffer stage having an input coupled to the drain of said N-channel enhancement-mode transistor and having an output coupled to said output node of said input-voltage detector circuit, said buffer stage generating one binary logic state at its output when a voltage potential near or more negative than ground is applied to its input, and said buffer stage generating the opposite binary logic state at its output when a voltage potential near that of said positive-voltage power supply node is applied to its input;

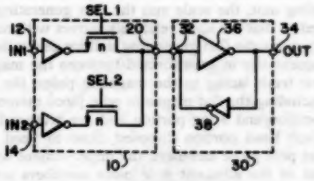
whereby the input-voltage detector circuit detects when a voltage more negative than ground by said second predetermined level is applied to said input node of said input-voltage detector circuit.

4,709,173

INTEGRATED CIRCUIT HAVING LATCH CIRCUIT WITH MULTIPLEXER SELECTION FUNCTION

Yoshito Nishimichi, Moriguchi; Masaru Uya, Hirakata, and Katsuyuki Kaneko, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed May 19, 1986, Ser. No. 864,466
Claims priority, application Japan, May 17, 1986, 60-105041
Int. Cl.⁴ H03K 3/356, 19/094
U.S. Cl. 307—243 1 Claim



1. An integrated circuit comprising:

a selection circuit having at least first and second input terminals to which input signals are applied, at least first and second selection terminals to which selection signals are applied, an output terminal, and at least first and second tri-state inverters, an input, control, and output of each of said tri-state inverters being respectively coupled to one of said input terminals, selection terminals and coupled in common to said output terminal of said selection circuit, each of said tri-state inverters having three output staes consisting of high level, low level, and high impedance states, said high and low level states being obtained when its selection signal is a first state, and said high impedance state being obtained when its selection signal is a second state;

a latch circuit having an input terminal, an output terminal, and first and second inverters, an input of said first inverter being coupled to said input terminal of said latch circuit and an output of said second inverter, an output of said first inverter being coupled to said output terminal of said latch circuit and an input terminal of said second inverter, said first and second inverters forming a bi-stable circuit, an output resistance of said second inverter being set to be at least ten times as high as an output resistance of any one of said tri-state inverters; and

a connection means for coupling said output terminal of said selection circuit to said input terminal of said latch circuit,

whereby, when said first selection terminal receives a selection signal of said first state, and said second selection

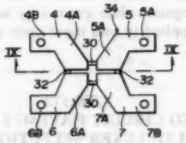
terminal receives a selection signal of said second state, an output of said first tri-state inverter is latched by said latch circuit.

4,709,174

MAGNETIC POLE PIECES FOR USING IN LINEAR PULSE MOTOR

Hiroshi Nakagawa, Ise, Japan, assignor to Shinko Electric Co., Ltd., Tokyo, Japan

Filed May 9, 1985, Ser. No. 732,416
Claims priority, application Japan, May 10, 1984, 59-93528; May 10, 1984, 59-93529
Int. Cl.[4] H02K *41/00*
U.S. Cl. 310—12 **4 Claims**



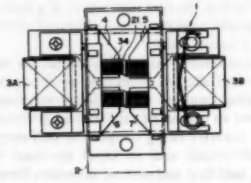
1. In a magnetic pole piece for use in a linear pulse motor comprising: a primary magnetic flux generating unit comprising a pair of cores each having a coil wound therearound and pairs of magnetic pole pieces, each magnetic pole piece being provided at either end portion of a corresponding core; and a scale having a row of first teeth formed therein along a direction of relative travel thereof with respect to the magnetic flux generating unit, the scale and the flux generating unit being disposed so that the scale relatively moves with respect to the primary magnetic flux generating unit by generating magnetic flux sequentially in gaps formed between the magnetic poles and first teeth facing to the magnetic poles, the pole pieces each including the flat magnetic pole piece member having a head portion and a leg portion and are arranged on a plane with each head portion disposed close to head portions of adjacent pole piece members, the improvement wherein head portions of the adjacent pole piece members are integrally connected by a connecting portion having such a small cross-sectional area that no substantial adverse affect is imparted on the performance of the linear pulse motor.

4,709,175

LINEAR PULSE MOTOR

Hiroshi Nakagawa, Ise, Japan, assignor to Shinko Electric Co., Ltd., Tokyo, Japan

Filed May 9, 1985, Ser. No. 732,415
Claims priority, application Japan, May 10, 1984, 59-93531
Int. Cl.[4] H02K *41/00*
U.S. Cl. 310—12 **4 Claims**



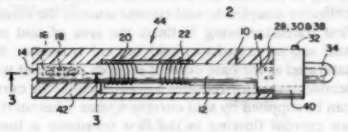
1. A linear pulse motor comprising: a primary magnetic flux generating unit comprising a pair of cores each having a coil would therearound and pairs of magnetic pole pieces, each pole piece being provided at either end portion of a corresponding core; a scale having a row of first teeth formed therein along a direction of relative travel thereof with respect to the magnetic flux generating unit, the scale and the flux generating unit being disposed so that the scale moves relative with respect to the primary magnetic flux generating unit be generating magnetic flux in gaps sequentially formed between the magnetic poses and teeth facing to the magnetic poles, the improvements wherein: the pole pieces each comprise a flat magnetic pole piece member having a head portion and a leg portion and are arranged on a plane with each head portion disposed close to head portions of adjacent pole piece members; and the pole pieces comprise ferromagnetic thin plate attached to upper faces of the pole piece members, the thin plate being provided in an upper face thereof with pole teeth portions corresponding to the head portions of the pole piece members, each pole teeth portion having second teeth formed at a predetermined pitch in parallel with the first teeth so that the second teeth face the first teeth and wherein the second teeth are parallel ridges formed in the ferromagnetic thin plate.

4,709,176

MAGNETIC BATTERY

William E. Ridley, 724 Western Ave., Topeka, Kans. 66606, and George Spector, 233 Broadway RM 3815, New York, N.Y. 10007

Filed Jul. 31, 1986, Ser. No. 891,140
Int. Cl.[4] H02K *35/00*
U.S. Cl. 310—15 **5 Claims**



1. A magnetic battery comprising:
(a) a non magnetic, non conductive housing having closed ends;
(b) a helical spring slideably disposed in said housing;
(c) a rippled polarized magnetic core mounted in said helical spring for reciprocating movement through said housing along the polar axis of said magnetic core in which said spring will increase said movement therethrough; and
(d) first and second coils disposed in spaced relationship on said housing so that said spring and magnetic core moves sequentially through said coils when sliding through said housing from one of said closed ends to other of said closed ends, said coils being wound in mutually opposite directions, connection together in series, said magnetic core having an effective polar length greater than distance between said coils and less than distance between outer ends of said coils and distance between said outer ends of said coils and adjacent said closed ends of said housing being at least as great as length of said magnetic core.

4,709,177

VENTILATED END TURNS FOR ROTOR WINDINGS OF A DYNAMOELECTRIC MACHINE

Christopher A. Kaminski, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 30, 1986, Ser. No. 880,465
Int. Cl.[4] H02K *1/20, 3/22*
U.S. Cl. 310—59 **14 Claims**

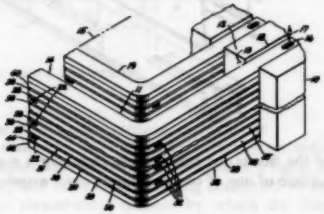
10. A rotor for a dynamoelectric machine, said rotor comprising:
a body portion defining axial winding slots circumferentially spaced on the periphery of the rotor body on either side of a pole portion of the rotor body; and
a rotor winding, said rotor winding including:
a plurality of axially extending slot lying portions disposed in said winding slots;
a plurality of end turns extending beyond the rotor body and

coupled to said plurality of slot lying portions, respective ones of said plurality of end turns electrically insulated from yet disposed in heat flow communication with adjacent ones of said plurality of end turns;

first gas coolant means defined in part by preselected ones of said plurality of end turns, said first gas coolant means having a first coolant gas inlet and a first coolant gas outlet; and,

second gas coolant means defined in part by preselected other ones of said plurality of end turns, said second gas coolant means having a second coolant gas inlet and a second coolant gas outlet;

wherein the developed length between the first coolant gas inlet and the first coolant gas outlet is greater than the



developed length between the second coolant gas inlet and the second coolant gas outlet and further wherein said first gas coolant means and said second gas coolant means are the only coolant means defined by the preselected ones and the preselected other ones of said plurality of end turns, respectively;

wherein the preselected ones of said plurality of end turns span the pole portion and said first coolant gas inlet is disposed proximate the center of the pole portion; and,

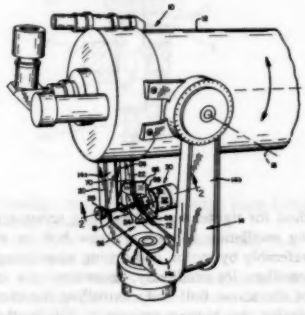
wherein the preselected other ones of said plurality of end turns span the pole portion and include a corner between the center of the pole portion and the axial end of the rotor body and further wherein said second coolant gas inlet is disposed proximate the corner.

4,709,178

MOTOR CONTROL FOR TELESCOPE

James D. Burr, 1960 Jefferson Co. Rd. 23, Evergreen, Colo. 80439

Filed Apr. 6, 1987, Ser. No. 35,085
Int. Cl.[4] H02R *5/02*; G02B *23/16*
U.S. Cl. 310—80 **6 Claims**



1. A motorized drive attachment for installation with the rotatable control shaft of a telescope where the shaft is mounted on and protrudes from a frame portion of the telescope, comprising:

a drive motor and a housing enclosing the motor, the motor having a drive shaft which projects therefrom and is exposed exteriorly of the motor housing,

a coupler secured to the exposed end of the drive shaft having a socket opening facing outwardly of the end of the shaft and said opening being lined with an annular drive element of plastomer material disposed concentric with the drive shaft and which is mounted within and extends about the interior of said socket opening, and

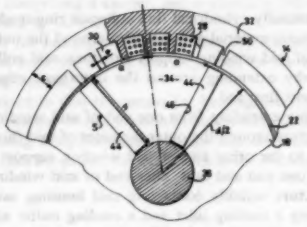
releasable clamp structure secured to the motor housing constructed to fit about the frame portion of the telescope with the control shaft of the telescope extending into said opening of the coupler and frictionally engaged circumferentially by the drive element with the drive element establishing a direct drive between the motor and control shaft.

4,709,179

PERMANENT-MAGNET SIX-POLE SYNCHRONOUS ELECTRODYNAMIC MACHINE

Louis Banon, Paris; Michel Lajoie-Mazenc, Montgiscard, and Pierre Mathieu, Olivet, all of France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

Continuation-in-part of Ser. No. 692,129, Jan. 17, 1985, abandoned. This application Aug. 16, 1985, Ser. No. 766,342
Claims priority, application France, Jan. 17, 1984, 84 00642; Apr. 23, 1985, 85 06143
Int. Cl.[4] H02K *21/12*
U.S. Cl. 310—156 **24 Claims**



1. A permanent-magnet six-pole synchronous electrodynamic machine comprising:

(a) a rotary shaft made of non-magnetic material;

(b) a stack of magnetic sheets made of ferrosilicon alloy slipped over said rotary shaft;

(c) six parallellepipedal radial permanent magnets mounted in radial slots in said stack of magnetic sheets; and

(d) a stator made of ferrosilicon magnetic sheet material surrounding said stack of magnetic sheets and radially spaced therefrom to leave an air gap therebetween, said stator having formed therein a plurality of half-closed slots delimited by a stator yoke, stator windings being received in said plurality of half-closed slots,

wherein:

(e) said six parallelepipedal radial permanent magnets are at least substantially identical;

(f) the ratio r_1 of the height (h) of the section of said permanent magnets through which the inductance flux passes to the inner diameter (d) of said stator is between 0.0281 and 0.344;

(g) said six parallelepipedal radial permanent magnets are equiangularly spaced around said rotary shaft; and

(h) the ratio r_2 of the length (a) of a peripheral polar half-arc separating the opposite faces of two consecutive ones of said six parallelepipedal radial permanent magnets to the height (h) is equal to 0.658.

4,709,180

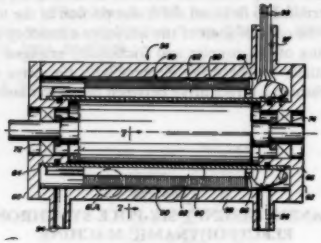
TOOTHLESS STATOR CONSTRUCTION FOR ELECTRICAL MACHINES

Joseph Denk, Manhattan Beach, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Nov. 20, 1985, Ser. No. 800,184

Int. Cl.[4] H02K *1/00*

U.S. Cl. 310—179 **16 Claims**



1. A stator for a permanent magnet electrical machine comprising:

a winding support structure made of non-magnetizable, non-conductive material, said winding support structure having a cylindrical portion with a plurality of thin longitudinal support fins which extend radially outwardly from said cylindrical portion, said support fins providing therebetween a plurality of slot areas;

stator windings laid into said slot areas between said support fins;

a substantially cylindrical flux collector ring made of ferromagnetic material and mounted around the outer periphery of said winding support structure, said collector ring thereby extending around the outermost edges of said support fins; and

a housing extending from one end of said winding support structure around the outer diameter of said flux collector ring to the other end of said winding support structure, said one end and said other end of said winding support structure sealably contacting said housing, said housing having a cooling inlet and a cooling outlet adapted for coolant flow through said stator windings.

4,709,181

SUBSLOT COVER FOR DYNAMOELECTRIC MACHINE

Scott K. Derderian, Salem, Mass., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 26, 1987, Ser. No. 19,096

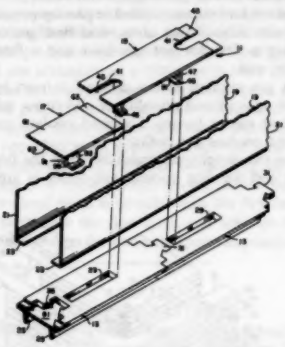
Int. Cl.[4] H02K *3/48*

U.S. Cl. 310—214 **13 Claims**

1. A subslot cover for a dynamoelectric machine comprising:

a radially inner member formed at each end with a pinetree dovetail, each inner member having an axially extending ventilation slot;

a radially outer member formed at each end with a ventilation half slot; a pair of tines depending from the outer member having hooks directed toward one another, each



of the hooks for respectively engaging a separate inner surface of one of two assembled inner members.

4,709,182

METHOD AND APPARATUS FOR TIGHTENING OR LOOSENING SCREW-TYPE CONNECTIONS

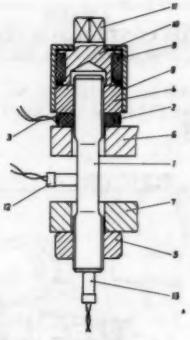
Hanno Wenske; Arnold Gallien; Martin Kauschinger; Klaus Unger; Josef Brendel, all of Grimma, and Lutz Lampe, Hermsdorf, all of German Democratic Rep., assignors to VEB Chemieanlagenbaukombinat Leipzig/Grimma, Grimma, German Democratic Rep.

Filed Jun. 13, 1986, Ser. No. 874,245

Claims priority, application German Democratic Rep., Jun. 20, 1985, 277574

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—316 **10 Claims**



1. Method for tightening or loosening screw-type connections using oscillation energy, a screw bolt or a nut being turned preferably by motor, comprising stimulating the screw bolt to oscillate longitudinally, measuring the natural frequency of the screw bolt and controlling the excitation frequency during the bolting process to follow the changing natural frequency, so that the screw bolt resonates, and adapting the excitation energy in such a manner, that the oscillating screw bolt in the phase of maximum stretching or contraction is largely relieved of tensile or compressive stresses respectively.

4,709,183

LINEAR MOTOR

Jürgen Lange, Eschborn, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed May 7, 1986, Ser. No. 860,636
Claims priority, application Fed. Rep. of Germany, May 7, 1985, 3516324
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—328 17 Claims

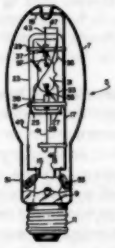
1. A linear motor comprising:
a rotor;
a stator;
at least one piezoelectric element; and wherein
said rotor comprises two rotor elements which are individually clampable to the stator as a function of a signal fed to the rotor, said rotor elements being connected by said at least one piezoelectric element by which the distance apart of said rotor elements is variable as a function of a control signal applied to said at least one piezoelectric element; and wherein
said rotor has a flat shape, siad motor further comprising
a frame-like holder containing said rotor elements, and wherein
at least one side of said frame-like holder is movable with respect to the other sides.

4,709,184

LOW WATTAGE METAL HALIDE LAMP

William M. Keeffe, Rockport, and Zeya K. Krasko, Danvers, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 642,009, Aug. 20, 1984, abandoned. This application May 30, 1986, Ser. No. 871,129
Int. Cl.[4] H01J *17/20*
U.S. Cl. 313—638 22 Claims



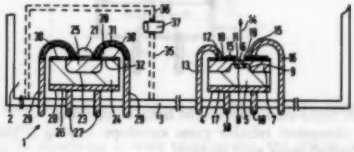
1. A low wattage metal halide discharge lamp comprising:
an outer sealed glass envelope;
a pair of electrical conductors sealed into and passing through said glass envelope;
an arc tube disposed within said outer glass envelope, said arc tube having a pair of spaced electrodes therein with each electrode electrically connected to one of said pair of electrical conductors; and
a chemical fill disposed within said arc tube, said fill consisting essentially of sodium iodide and scandium iodide in a molar ratio in the range of about 20:1 to 28:1, elemental mercury, scandium, and an inert gas.

4,709,185

DEVICE FOR ELECTRON EMISSION INCLUDING DEVICE FOR PROVIDING WORK FUNCTION-REDUCING LAYER AND METHOD OF APPLYING SUCH A LAYER

Arthur M. E. Hoeberechts; Henricus A. M. Van Hal; Harm Tolner, and Gerardus G. P. Van Gorkom, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 10, 1985, Ser. No. 743,221
Claims priority, application Netherlands, Jun. 13, 1984, 8401866
Int. Cl.[4] C23C *14/00*
U.S. Cl. 313—346 R 13 Claims



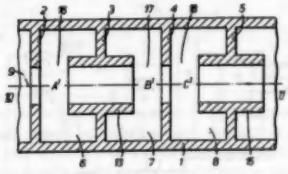
1. An electron-emitting device comprising:
(a) an envelope which is evacuated or filled with an inert protective gas;
(b) an electron-emitting body located in the envelope;
(c) means located in the envelope for coating an electron-emitting surface of the body with a layer of material reducing the electron work function of the surface, said means comprising a carrier, and a source of the material supported by the carrier;
(d) means for heating the source, whereby the material is released from the source and deposited on the electron-emitting surface,
characterized in that the means for heating the source is a semiconductor device located in the envelope, the device comprising a semiconductor body and electrical leads, and in that the carrier for the source is the semiconductor body.

4,709,186

COUPLED CAVITY TRAVELLING WAVE TUBES

Richard G. Carter, Carnforth, England, assignor to English Electric Valve Company Limited, Chelmsford, England

Filed Jan. 10, 1986, Ser. No. 817,782
Int. Cl.[4] H01J *25/34*
U.S. Cl. 315—3.5 4 Claims



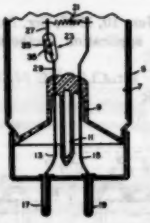
1. A coupled cavity travelling wave tube having a slow wave structure comprising a plurality of greater than two coupled cavities and wherein the intersection gaps of successive cavities are displaced, with reference to the transverse central plane of the respective cavity, alternately towards the input end of said slow wave structure and towards the output end of said slow wave structure.

4,709,187

LAMP WITH LEAD WIRE THERMAL SWITCH

William J. Roche, Essex, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Filed Mar. 28, 1985, Ser. No. 717,211
Int. Cl.[4] H05B *41/18*
U.S. Cl. 315—74 **6 Claims**



1. A rapid-start fluorescent lamp comprising:

an elongated tubular glass envelope having a phosphor-coated inner wall surface;

a pair of spaced electrodes positioned within the ends of said elongated tubular glass envelope;

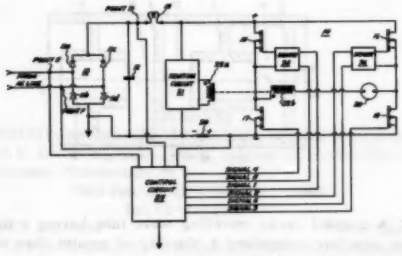
a pair of electrical leads sealed into and passing through each end of said elongated tubular glass envelope and formed for connection to an external energizing source, one of said pair of electrical leads at each end of said envelope being directly connected to one of said pair of spaced electrodes and the other one of said pair of electrical leads at each end of said envelope including a circuit breaker therein connecting said electrical lead to the opposite end of one of said pair of spaced electrodes, said circuit breaker including a pair of spaced leads with one of said leads sealed directly into one end of said envelope and connected to said one of said pair of electrical leads and the other one of said leads directly connected to one of said pair of electrodes and a bimetal strip affixed to one of said pair of spaced leads and formed to contact the other one of said pair of spaced leads at a temperature below a given range of temperatures and to discontinue said contact within said given range of temperatures.

4,709,188

OPERATION OF STANDBY FILAMENT ASSOCIATED WITH AN AC ARC DISCHARGE LAMP BALLAST

Victor D. Roberts, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 23, 1985, Ser. No. 812,551
Int. Cl.[4] H05B *35/00, 37/02*
U.S. Cl. 315—178 **9 Claims**



1. In a lighting system adapted to be coupled to a source of electrical energy, said system comprising an incandescent filament; an arc discharge lamp; a polarity-reversing bridge including at least one converter leg, each leg being comprised of a pair of switching elements connected in series, the junction of each pair of switching elements being coupled to said arc discharge lamp, each converter leg adapted to have one of its switching elements turned on when said bridge is in a first phase and to have its other switching element turned on when said bridge is in a second phase, said bridge being connected in series with said filament; oscillator means coupled to said arc discharge lamp for providing a high-voltage signal to said arc discharge lamp during its breakdown and glow discharge modes; and control means coupled to said oscillator means for signalling said oscillator means to produce said high-voltage signal in order to start an arc discharge in said arc discharge lamp, the improvement comprising:

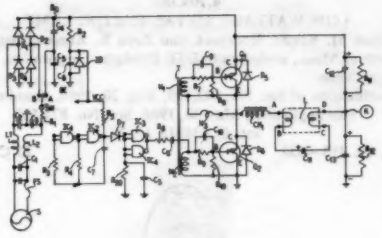
circuit means coupling said control means independently to each of said switching elements for holding said bridge in one of said phases when said oscillator means is signalled to produce said high voltage signal and periodically reversing the phase of said bridge after an arc has been established, said control means turning on both switching elements in at least one converter leg if said oscillator means fails to establish an arc within a first predetermined time.

4,709,189

TRANSISTOR INVERTER DEVICE FOR FLUORESCENT LAMP

Toshiyuki Kuchii, 109-8, Ishikawa-cho 3-chome, Naka-ku, Yokohama-shi, Kanagawa-ken, Japan

Filed Jan. 24, 1985, Ser. No. 673,731
Int. Cl.[4] H05B *37/02*
U.S. Cl. 315—209 R **1 Claim**



1. A transistor inverter device having high efficiency and low power consumption for a fluorescent lamp which comprises: an oscillator constructed as an integrated circuit which generates a square wave; an input transformer which has two base windings generating opposite polarities of the square waves, one of the base windings connected to the oscillator and receiving the square wave from said oscillator; a switching circuit including two transistors connected in tandem with one of the transistors having one of the base windings connected between its base and its emitter and the other transistor having the other base winding connected between its base and its emitter so that one of the transistors is turned on and the other is turned off during a half cycle of the square wave in response to opposite polarities of the square waves generated in the base windings; a fluoresent lamp connected with one terminal to the junction between the two transistors; and electrical charging capacitors connected to the other terminal of the fluorescent lamp so as to provide an inverter device having high efficiency and low power requirements, and and further including a resistor and a capacitor connected in series and connected between the integrated circuit oscillator and the switching circuit to cause smooth switching of the switching circuit.

4,709,190

METHOD FOR OPERATING AN ABSORBANCE MONITOR

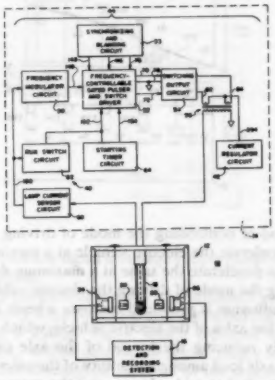
Robert W. Allington, Lincoln, Nebr., assignor to Isco, Inc., Lincoln, Nebr.

Division of Ser. No. 534,581, Sep. 22, 1983, Pat. No. 4,587,463. This application Oct. 15, 1985, Ser. No. 787,753

The portion of the term of this patent subsequent to May 6, 2003, has been disclaimed.

Int. Cl.[4] H05B *41/36*

U.S. Cl. 315—307 **10 Claims**



1. A method of operating an absorbance monitor comprising the steps of:

applying pulses of a predetermined amplitude through a lamp transformer to a lamp, wherein the lamp transformer having sufficiently high inductance and low loss to store energy capable of creating a pulse of at least 1,000 volts amplitude with a pulse width of at least 10 microseconds across a resistance of at least 20 kiloohms in the secondary of the lamp transformer from an average current flowing through the primary corresponding to an input power load of less than five times the normal operating power;

providing a dead space of zero current amplitude between said pulses of said predetermined amplitude;

discharging the current from said transformer into said lamp during the start-up period of said lamp during said dead space; and

increasing the frequency of pulses through said transformer until said current reaches a predetermined amplitude.

4,709,191

PROCESS FOR ADJUSTING A DEFLECTION UNIT FOR A THREE ALIGNED GUN TELEVISION TUBE AND DEVICE FOR REDUCING TO PRACTICE SAID PROCESS

Roger Pieri, Genlis, and Jean C. Fringant, Dijon, both of France, assignors to Videocolor, Montrouge, France

Filed Sep. 16, 1985, Ser. No. 776,631

Claims priority, application France, Sep. 21, 1984, 84 14569

Int. Cl.[4] H01J *29/56*; H04N *17/02*; G01R *33/00*

U.S. Cl. 315—370 **14 Claims**

1. Process for adjusting a deflection unit for a television tube with three aligned guns, comprising the steps of:

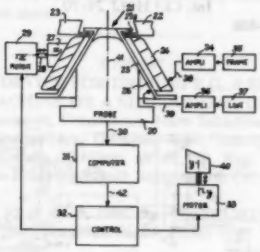
1. disposing the deflection unit upon a head for measuring magnetic field gradients;

2. measuring these field gradients;

3. displacing about a central magnetic axis a support ferrite of a raster winding so as to obtain orthogonality of the raster with respect to line fields;

4. simulating an alignment of the deflection unit in a television tube by furnishing a voltage proportional to the angular shift between the axis of the head and each means axis of symmetry of the raster and line fields;

5. displacing the ferrite in at least one direction of a plane orthogonal to the axis of the measuring head in such a way



as to cancel out the voltages proportional to the angular shifts; and

6. fixing, or steadying at least temporarily, the ferrite with respect to a line winding.

4,709,192

PROCESS AND CIRCUIT FOR AVOIDING OF NONLINEARITIES AND BRIGHTENING ON THE PICTURE EDGES IN TELEVISION PICK UP TUBES

Rainer Gehrmann, Alsbach-Haehnlein, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

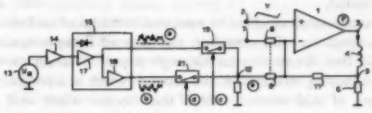
PCT No. PCT/DE85/00195, § 371 Date Dec. 12, 1985, § 102(e) Date Dec. 12, 1985, PCT Pub. No. WO86/00187, PCT Pub. Date Jan. 3, 1986

PCT Filed Jun. 1, 1985, Ser. No. 819,512

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1984, 3421684

Int. Cl.[4] H01J *29/56*

U.S. Cl. 315—371 **8 Claims**



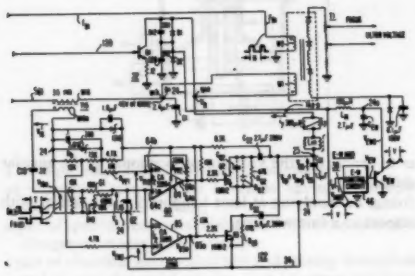
1. Process for avoiding non-linearities and brightening on television picture edges by overscanning the active picture range on the signal electrode of a television pick-up tube and adding additional signals to the saw-tooth deflection signals for the horizontal and vertical deflection, comprising the steps of generating an additional signal of higher frequency than that of the deflection signals; separating positive amplitudes of the additional signal from negative amplitudes thereof; invertedly adding to the deflection signals during the blackout interval before the return movement period a plurality of the separated positive amplitudes; and invertedly adding to the deflection signals immediately after the return movement period a plurality of the separated negative amplitudes.

4,709,193

S-CAPACITANCE SWITCHING CIRCUIT FOR A VIDEO DISPLAY

Wolfgang F. W. Dietz, New Hope, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed May 30, 1986, Ser. No. 868,631
Int. Cl.[4] H01J *29/70*
U.S. Cl. 315—408 19 Claims



1. A deflection apparatus for generating a deflection current in a deflection winding, said apparatus being capable of generating said deflection current at a frequency selected from any one of first and second ranges of scan frequencies such that S-correction is provided at the selected frequency, comprising:

a source of an input signal at a frequency that is related to the selected frequency;

a source of energizing voltage;

switching means responsive to said input signal and coupled to said deflection winding for producing said deflection current at the selected frequency in accordance with said energizing voltage;

a first S-capacitance that is coupled to said deflection winding for developing a first voltage that varies in a parabolic manner to provide the S-correction when the selected frequency is included in said first range of frequencies;

a second S-capacitance having a first terminal that is coupled to said first S-capacitance and to said energizing voltage such that a first DC voltage is developed at said first terminal;

a second switch coupled to a second terminal of said second S-capacitance for coupling said second S-capacitance to said first S-capacitance through a pair of main current conducting terminals of the second switch at a conductive state of said second switch that occurs when said frequency is selected from said second range of frequencies and for decoupling said second S-capacitance from said first S-capacitance at a nonconductive state of said second switch that occurs when said frequency is selected from said first range of frequencies, such that when said second switch is at said nonconductive state, said first DC voltage is developed at said first terminal; and

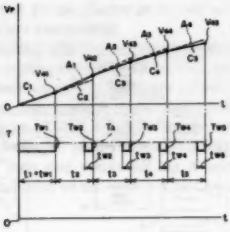
means coupled at a junction between one terminal of said pair of main current conducting terminals and said second terminal of said second S-capacitance for developing across said second S-capacitance, when said second switch is at said nonconductive state, a second DC voltage at a magnitude that substantially prevents said second S-capacitance from capacitively coupling said first DC voltage to said one terminal of said second switch.

4,709,194

METHOD OF CONTROLLING THE MODE OF DRIVING ELECTRIC VEHICLES

Shigeichi Yagi, and Junichi Shigeura, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 18, 1986, Ser. No. 886,605
Claims priority, application Japan, Sep. 20, 1985, 60-209425
Int. Cl.[4] B61C *15/12*
U.S. Cl. 318—52 4 Claims



1. A method of controlling the mode of driving an electric vehicle to accelerate the electric vehicle at a maximum acceleration and to decelerate the same at a maximum deceleration by controlling the mode of driving the electric vehicle so that a maximum adhesion is produced between wheels attached to a plurality of the axles of the electric vehicle; which comprises:

successively reducing the torque of the axle carrying the greatest axle load among a plurality of the axles so that the wheel attached to said axle carrying the greatest axle load is brought into steady rolling contact with the rail in order to detect the variation of the running speed of the electric vehicle relative to the rail;

estimating the variation of the running speed of the electric vehicle as a function of time for the subsequent time interval between two successive torque reducing operations on the basis of the ratio of variation of the running speed in the preceding time interval between two successive torque reducing operations to said preceding time interval;

minutely controlling the revolving speed of said axle carrying the greatest axle load on the basis of the estimated variation of the running speed with time so that a maximum adhesion meeting the running condition of the electric vehicle is produced between the wheels and the rail.

4,709,195

BAR CODE SCANNER WITH DC BRUSHLESS MOTOR

Ronald A. Hellekson, Eugene, and Donald S. Peterson, Philomath, both of Oreg., assignors to Spectra-Physics, Inc., San Jose, Calif.

Filed Sep. 12, 1986, Ser. No. 907,293
Int. Cl.[4] H02K *29/08*
U.S. Cl. 318—254 9 Claims

1. In a laser scanner including a rotating scanning element, a motor and associated circuitry, the improvement comprising:

said motor being a DC brushless motor,

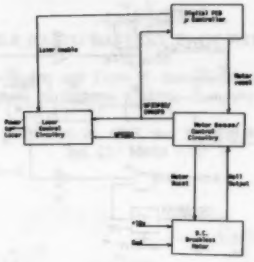
said DC brushless motor connected to the rotating scanning element, the motor being closed-loop velocity controlled and including a hall effect device,

motor detector circuitry means for receiving a hall effect signal from the hall effect device, and including means for deriving a voltage proportional to frequency of the hall effect signal, means for comparing the derived voltage to a reference voltage representative of a minimum permissible operating speed, means for outputting a voltage signal which indicates either up to speed, i.e. within permissible speed range, or not up to speed, and means for shutting off a laser of the scanner when the motor is not up to speed.

5. A method for producing a signal indicating motor speed for use in shutting off a laser for safety purposes in a laser scanner having a motor-driven rotating scanner element, comprising the steps of:

providing a DC brushless motor connected to drive the rotating scanner element, the motor being closed-loop velocity controlled and including at least one hall effect device,

receiving a signal from the hall effect device,



deriving from the signal a voltage proportional to frequency of the signal,

comparing the derived voltage to a reference voltage representative of a minimum permissible operating speed,

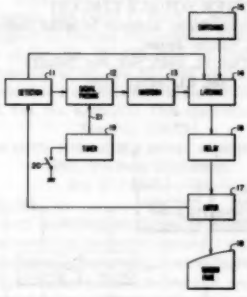
outputting a voltage signal which indicates either up to speed, i.e., within permissible speed rang,e or not up to speed, and shutting off the laser of the scanner when the motor is not up to speed.

4,709,196

POWER WINDOW DEVICE WITH SAFETY DETECTOR AND CONTROL OVERRIDE

Ken Mizuta, Miyagi, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Aug. 29, 1986, Ser. No. 902,472
Claims priority, application Japan, Sep. 4, 1985, 60-135812
Int. Cl.[4] H02P *1/22*
U.S. Cl. 318—282 **8 Claims**



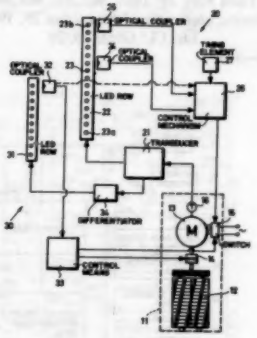
1. In a power window device including a drive motor and a window pane moved up and down by the drive motor, and adapted to detect that a foreign matter or obstacle is sandwiched between the upper margin of the windowpane and an opposed window frame during upward movement of the windowpane, an improvement comprising: a sensor means monitoring a motor characteristic of said motor; a comparator means comparing a present value and a given time preceding value of the motor characteristic monitored by said sensor means; a detection signal output means producing a detection signal when deviation of the motor characteristic resulting from the comparison in said comparator means exceeds a predetermined value; a switching means responsive to said detection signal to invert the movement direction of said windowpane by said drive motor; and a control means activated to prohibit the inversion of the windowpane movement for a predetermined time.

4,709,197

CONTROL DEVICE FOR DRIVING E.G. A SHREDDING MACHINE OR A SIMILAR MACHINE

Albert Goldhammer, Ueberlingen; Hans Schleicher, Markdorf; Hartmut Stangenberg, Owingen; Rolf Gasteier, Markdorf, and Jens Erlecke, Wolfegg, all of Fed. Rep. of Germany, assignors to Feinwerktechnik Schleicher & Co., Fed. Rep. of Germany

Filed Jul. 8, 1986, Ser. No. 883,352
Int. Cl.[4] B02C *25/00*; H02H *7/08*
U.S. Cl. 318—480 **7 Claims**



1. A shredding machine, comprising:

a shredding mechanism having movable means for contacting material to be shredded;

an electric motor operative to drive the shredding mechanism, the electric motor being electrically connectable to a source of electrical energy and mechanically connectable to the shredding mechanism, through a control device, the control device including:

means developing electrical signals having values representing instantaneous operational parameters of the motor;

a differentiating means having an input and output, the input being connected to receive at least one of the signals representing the operational parameters of the motor and the output reflecting an instantaneous rate of change of said at least one signal, the output of the differentiating means being connected to a control means through a light source responsive to said output and an optical coupling means responsive to said light source, the control means generating a control output in response to the output of the differentiating means, the control output being connected to means for altering said operational parameters.

7. A shredding machine, comprising:

a shredding mechanism drivable by an electric motor, the shredding mechanism being subject to blockage;

at least one sensor operable to develop a signal having a value varying as a function of an operational parameter of the shredding machine that varies with loading of the shredding mechanism;

a control means operable to generate an output to alleviate loading of one of the shredding mechanism and the electric motor;

a display means having a plurality of light emitting diodes (LEDs) in an array, the light emitting diodes being sequentially operable for indicating a rate of change of said operational parameters indicating loading; and,

an optical detector responsive to at least one of the LEDs in the display means, said optical detector being connected to the control means, whereby the control means is operable to alleviate loading on one of the shredding mechanism and the motor when the rate of change of said operational parameters indicating loading exceed a threshold.

4,709,198

HIGH-SPEED MACHINING CONTROLLER

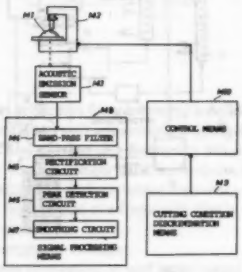
Kazutaka Ogo; Masahiro Hayashi, both of Nagoya; Takatoshi Suzuki, Anjo; Katsuiku Hokao, Toyota; Akio Asai, Aichi, and Takayuki Tsuruhashi, Toyota, all of Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed May 29, 1986, Ser. No. 868,041

Claims priority, application Japan, May 29, 1985, 60-81771

Int. Cl.[4] G05B *19/24*

U.S. Cl. 318—571 **6 Claims**



1. A high speed machining controller for controlling a machine tool comprising:

an acoustic emission sensor for detecting an acoustic emission generated from said machine tool by machining the workpiece;

a signal processing means for processing an output signal of said acoustic emission sensor in order to detect an amplitude of the output signal, said signal processing means including,

a band-pass filter for inputting a signal from said acoustic emission sensor and for passing a component of the inputted signal, the component having a frequency band corresponding to the acoustic emission,

a rectification circuit for inputting a signal from said band-pass filter and for rectifying the inputted signal,

a peak detection circuit for inputting a signal from said rectification circuit and for detecting peak values of the inputted signal, and

a smoothing circuit for inputting a signal from said peak detection circuit, for smoothing the inputting signal and for outputting the smoothed signal as a signal corresponding to the amplitude of the acoustic emission;

a cutting condition detection means for detecting cutting conditions of a system including said highspeed machine tool and the workpiece by comparing the detected amplitude of the acoustic emission with a predetermined reference value; and

a control means for controlling machining condition of the system including at least a feed speed of the machine tool on the basis of the detected cutting condition.

4,709,199

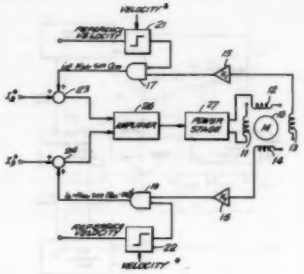
VELOCITY FEEDBACK CONTROL OF STEP MOTORS

Xian T. Wang, c/o I. Zuckerman, 215 Park Row, Apt. 21H, New York, N.Y. 10038, and Rolf Eichenwald, 32 Buckingham Meadow Rd., Setauket, N.Y. 11733

Filed Jun. 25, 1985, Ser. No. 748,645

Int. Cl.[4] H02P *8/00*

U.S. Cl. 318—696 **7 Claims**



1. A control system for a step motor of the type responsive to current command signals and having at least two power phase windings, wherein the improvement comprises:

a first velocity coil disposed in phase to the first power phase winding;

a second velocity coil disposed in phase to the second power phase winding;

means for generating a reference velocity signal;

means for feeding back the outputs of said first and second velocity coils; and

means for summing the outputs of said velocity coils with the current command signals when the velocity of the step motor is below the reference velocity signal, such that the step motor is sufficiently damped to minimize the step motor from oscillating about a desired stopping point when said current command signals are applied to the step motor.

4,709,200

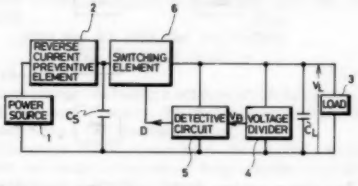
POWER SOURCE CIRCUIT

Hitoshi Ochiai, Tokyo, Japan, assignor to Seiko Instruments & Electronics Ltd., Tokyo, Japan

Filed Oct. 21, 1985, Ser. No. 789,611

Int. Cl.[4] H02J *9/00*

U.S. Cl. 320—1 **14 Claims**



1. A power source circuit comprising:

a power source for generating electric energy;

a first condenser connected in parallel with said power source for receiving therefrom the electric energy;

a second condenser for supplying electric energy to a load connected in parallel with said second condenser;

a switching element connected in series with said first condenser and said second condenser for controlling the

electric energy transfer from said first condenser to said second condenser; and

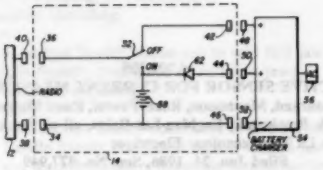
detecting circuit means for detecting a terminal voltage level of said second condenser and for controlling the ON and OFF operation of said switching element in response to the detecting result of said terminal voltage level of said second condenser to enable said switching element to effect the electric energy transfer to thereby maintain the terminal voltage level within a predetermined range.

4,709,201

PORTABLE RADIO BATTERY PACK WITH ON-OFF SWITCH

Henry A. Schaefer, and Terry N. Garner, both of Lynchburg, Va., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 24, 1985, Ser. No. 790,903
Int. Cl.[4] H02J *7/00*
U.S. Cl. 320—2 **9 Claims**



1. A modular battery pack for powering a radio comprising:

a rechargeable battery cell;

a set of power output contacts;

a set of power input contacts;

means for electrically interconnecting said input and output contacts and said battery cell such that said output contacts may be alternatively interconnected to said battery cell, or to said input contacts while simultaneously electrically isolating battery cell power from said input and output contacts.

4,709,202

BATTERY POWERED SYSTEM

Steven E. Koenck, and David C. Hacker, both of Cedar Rapids, Iowa, assignors to Norand Corporation, Cedar Rapids, Iowa

Division of Ser. No. 797,235, Nov. 12, 1985, which is a continuation-in-part of Ser. No. 612,588, May 21, 1984, Pat. No. 4,553,081, which is a continuation-in-part of Ser. No. 385,830, Jun. 7, 1982, Pat. No. 4,455,523. This application Jun. 19, 1986, Ser. No. 876,194

The portion of the term of this patent subsequent to Jun. 19, 2001, has been disclaimed.

Int. Cl.[4] H02J *7/00*
U.S. Cl. 320—43 **80 Claims**

1. In a system including rechargeable battery means,

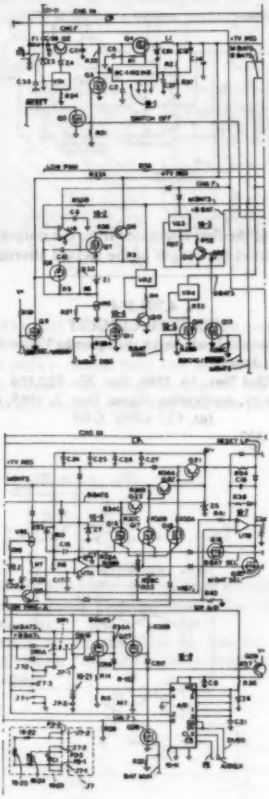
temperature sensing means for sensing temperature,

battery conditioning means for controlling supply of charging current to the battery means and operable for selectively supplying a relatively high charge rate and a relatively low charge rate,

processing means coupled with said battery conditioning means and controlling said battery conditioning means to selectively supply said relatively high charge rate and said relatively low charge rate at least partially in dependence upon relatively high and relatively low ambient temperature respectively,

charge input means for coupling with the rechargeable battery means for supplying charging current thereto, and

analog to digital converter means coupled with said temperature sensing means and with said charge input means, and coupled with said processing means for supplying measures of ambient temperature and charge input voltage to said processing means.



4,709,203

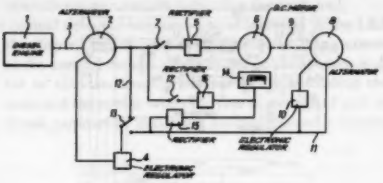
ON BOARD POWER SUPPLY PARTICULARLY FOR A SHIP PROPELLED BY A VARIABLE SPEED DIESEL ENGINE

Yves M. J. P. Roux, Rouillac, and Patrice G. L. Pitaud, Concarneau, both of France, assignors to Moteurs Leroy-Somer, Angouleme, France

Filed Oct. 3, 1985, Ser. No. 783,427
Claims priority, application France, Oct. 3, 1984, 84 15167
Int. Cl.[4] H02P *9/30*; **H02J** *9/00*
U.S. Cl. 322—87 **3 Claims**

1. On board electrical power supply, for a ship or vessel powered by a variable speed diesel engine comprising, a first alternator coupled to the diesel engine, an electronic regulator for the first alternator, a rectifier for rectifying the output current of the first alternator, a direct current motor powered

from the output of the rectifier, a second alternator coupled to the direct current motor, and means for selectively powering



the regulator of the first alternator from the output of the first alternator or from the output of the second alternator.

4,709,204

LIMITER CIRCUIT

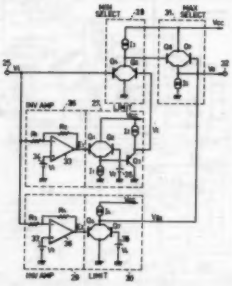
Mitsuru Hayakawa, Iwai, Japan, assignor to Victor Company of Japan, Ltd., Japan

Filed Nov. 18, 1986, Ser. No. 932,186

Claims priority, application Japan, Dec. 2, 1985, 60-271143

Int. Cl.[4] G05F *5/08*

U.S. Cl. 323—303 **11 Claims**



1. A limiter circuit comprising:

a first circuit supplied with an input voltage, said first circuit comprising a first inverting amplifier for inverting and amplifying a voltage supplied thereto with such an input versus output characteristic that an output voltage of said first inverting amplifier decreaes with an increase in an input voltage of said first inverting amplifier and is equal to the input voltage of said first inverting amplifier when the input voltage of said first inverting amplifier is equal to a first reference voltage and a first limiter for limiting a voltage supplied thereto to a second reference voltage, said first inverting amplifier and said first limiter being coupled in series in an arbitrary sequence, said first reference voltage being larger than said second reference voltage;

a second circuit supplied with said input voltage, said second circuit comprising a second inverting amplifier for inverting and amplifying a voltage supplied thereto with such an input versus output characteristic that an output voltage of said second inverting amplifier increases with a decrease in an input voltage of said second inverting amplifier and is equal to the input voltage of said second inverting amplifier when the input voltage of said second inverting amplifier is equal to a third reference voltage and a second limiter for limiting a voltage supplied thereto to a fourth reference voltage, said second inverting amplifier and said second limiter being coupled in series in an arbitrary sequence, said fourth reference voltage being larger than said third reference voltage; and

a third circuit supplied with said input voltage and output voltages of said first and second circuits for producing an output voltage of said third circuit having an amplitude thereof limited with a predetermined input versus output characteristic, said third circuit limiting the amplitude of said input voltage so that the amplitude of the output voltage of said third circuit non-linearly converges to said fourth reference voltage when said input voltage becomes smaller than said third reference voltage and the amplitude of the output voltage of said third circuit non-linearly converges to said second reference voltage when said input voltage becomes larger than said first reference voltage.

4,709,205

INDUCTIVE SENSOR FOR CURRENT MEASUREMENT

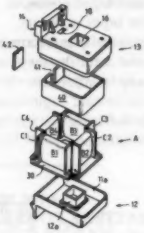
Gilles Baurand, Montesson; René Fouret, Rueil Malmaison, and Marek Rundsztuk, Enghien-Les-Bains, all of France, assignors to La Telemecanique Electrique

Filed Jun. 24, 1986, Ser. No. 877,949

Claims priority, application France, Jun. 28, 1985, 85 09864

Int. Cl.[4] G01R *19/00*

U.S. Cl. 324—127 **3 Claims**



1. An inductive current measuring sensor for measuring the current flowing through a power conductor, said sensor comprising :

i. a printed circuit board having first and second faces and a central recess with dimensions predetermined as a function of the power rating of said power conductor, first and second elongate conductive tracks on said first face, and first and second output terminals respectively connected to the first and second tracks at one end thereof ;

ii. a plurality of insulating bobbins mounted on said second face in a closed polygonal contour surrounding said central recess ;

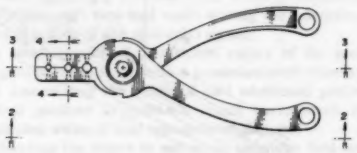
iii. a plurality of Rogowski conductive coils mounted on the respective bobbins, said coils each having first and second terminals and being serially connected together from the first terminal of a first coil to the second terminal of a last coil, the first terminal of the first coil and the second terminal of the last coil being mounted across said printed circuit board and secured to the first face thereof, the first terminal of the first coil being connected to the first track at the opposite end thereof and the second terminal of the last coil being connected to the second track at the opposite end thereof.

4,709,206

OUCH SAVER CIRCUIT TESTER GUIDE AND METHODS OF CONSTRUCTING AND UTILIZING SAME

Gene R. Edwards, 1321 Michigan Ave., and Charles W. Anderson, 818 Woodworth, both of Alma, Mich. 48801

Filed May 12, 1986, Ser. No. 861,930
Int. Cl.[4] G01R *1/06, 31/02;* B25B *7/02*
U.S. Cl. 324—158 P **7 Claims**



1. A device to be used with a needlepoint electrical circuit tester probe, comprising, in combination:
a first member, including:
a first jaw;
a first joint section fixedly connected to said first jaw;
a first handle fiexedly connected to said first jaw;
a second member, including:
a second jaw;
a second joint section fixedly connected to said second jaw;
a second handle fixedly connected to said second jaw;
said first and second members have said respective first and second joint sections pivotably connected together;
said first and second jaws are provided with gripping surfaces;
said first and second jaws have said gripping surfaces disposed for operable engagement with one another;
said gripping surfaces of said first and second jaws are provided with a plurality of transverse concavities which align when said gripping surfaces are brought into operable engagement to form substantially circular transverse openings;
said plurality of substantially circular transverse openings formed when said first and second jaws are brought into operable engagement have a plurality of differing diameters;
said first and second jaws having provided therein a plurality of tapered guide channels which have a substantially orthogonal relationship to said plurality of transverse concavities provided in said gripping surfaces of said first and second jaws;
said channels are of a predetermined size for receiving said probe.

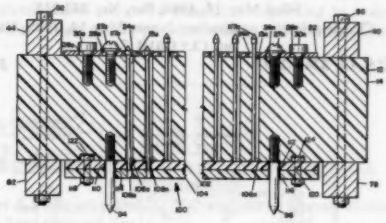
4,709,207

LOADING SYSTEM

James R. Larson, Anoka, Minn., assignor to Holaday Circuits, Inc., Minnetonka, Minn.

Filed Aug. 8, 1985, Ser. No. 763,570
Int. Cl.[4] G01R *31/02*
U.S. Cl. 324—158 F **7 Claims**

1. Loading system comprising:
a. a plurality of test pins;
b. test pin loading body having a thickness equal to at least 50% of the length of said pins and a plurality of holes arranged in a grid array for supporting said test pins;
c. lock plate including a like plurality of holes and positioned over said loading body;
d. said lock plate movable between a locked position holding said pins in said loading body and an unlocked position allowing said pins to fall from said loading body;
e. test pattern means including an upper test pattern plate having holes therein corresponding to those of said test pins to be used in a test and a lower test pattern plate having holes therein corresponding to contact points on a circuit to be tested;
f. registration dowels for registering said test pattern means to said loading body for selective loading of said test pins



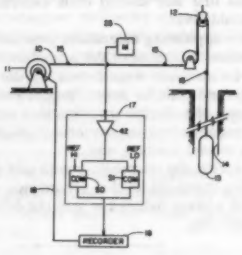
from said loading body to said test pattern means in accordance with the holes in said lower test pattern plate when said lock plate is moved from said locked position to said unlocked position providing for gravity fall of said test pins from said loading body into said test pattern means.

4,709,208

MAGNETIC MARK DETECTOR SYSTEM

Wayne L. Kerr, Houston, Tex., assignor to Kerr Measurement Systems, Inc., Tex.

Filed Dec. 19, 1985, Ser. No. 810,775
Int. Cl.[4] G01B *7/04;* G01R *33/02;* H01L *43/00*
U.S. Cl. 324—206 **9 Claims**



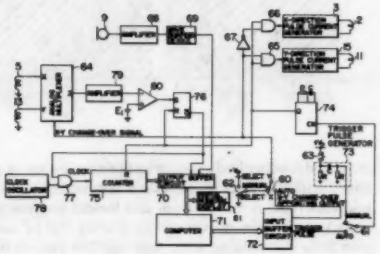
1. A magnetic mark detector system for detecting magnetic marks on a cable where each of such marks have a predefined magnetic span between opposite poles including:
magnetic flux concentrator means including elongated bar members disposed end to end relative to one another along a longitudinal axis, said bar members having facing end sections configured to focus magnetic flux toward a longitudinal axis extending through said bar members,
Hall effect means disposed between the facing ends of said bar members for responding to magnetic flux in said bar members and providing an output signal as a function of magnetic flux detected, and
said bar members and said Hall device, in assembly, having an overall span length along said longitudinal axis matched to a predefined magnetic span of a magnetic mark on a cable, said bar members being constructed from high permeability magnetic material.

4,709,209

MAGNETOSTRICTIVE VIBRATION WAVE POSITION DETECTING APPARATUS WITH VARIABLE THRESHOLD DETECTING VALVES

Azuma Murakami; Yuji Katsurahira, and Yoshinori Taguchi, all of Kuki, Japan, assignors to Wacom Co., Ltd., Saitama, Japan

Filed May 14, 1986, Ser. No. 863,212
Claims priority, application Japan, May 14, 1985, 60-102166
Int. Cl.[4] G01B *7/14*
U.S. Cl. 324—207 **3 Claims**



1. A position detecting apparatus comprising:
a plurality of magnetostrictive transmission medium elements arranged substantially in parallel with one another;
a first coil wound commonly around one end of said magnetostrictive transmission medium elements;
a second coil wound over a substantial portion of each of said magnetostrictive transmission medium elements;
a pulse current generator for applying a pulse current to either one of said first or second coils so as to produce magnetostrictive vibration waves in said magnetostrictive transmission medium elements;
a processor for detecting the time from the moment at which said magnetostrictive vibration waves are generated and a moment at which the level of voltage induced in the other of said first and second coils exceeds a predetermined threshold level;
a position appointing magnetism generator superposed over a position of an area of the magnetostrictive transmission medium elements wound over by the other of said first and second coils for generating magnetism which locally increases the electric-mechanical coupling coefficient of said magnetostrictive transmission medium elements proximate to said position; and
means electrically cooperating with said processor for varying said threshold level in accordance with the peak level of said voltage induced in said the other of said first and second coils.

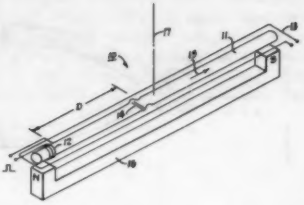
4,709,210

MAGNETOACOUSTIC PROXIMITY SENSOR

Robert J. Pond, 4198 Eastern Rd., Doylestown, Ohio 44230

Filed May 2, 1985, Ser. No. 729,658
Int. Cl.[4] G01B *7/14*; G01H *5/00*
U.S. Cl. 324—207 **13 Claims**

1. A magnetoacoustic proximity sensor comprising, in combination:
an elongated magnetostrictive member having a given length, width, and thickness and wherein the length is long relative to its thickness:
pulsing means to establish a strain wave traveling lengthwise through said magnetostrictive member and a magnetic field surrounding and concurrently traveling lengthwise of said magnetostrictive member;
an elongated conductive pickup member positioned with the length thereof substantially coextensive with the length of said elongated magnetostrictive member;
said pickup member having at least two coil sides disposed generally on opposite sides and following the length of said magnetostrictive member:
each increment of length of said coil sides being substantially parallel to the corresponding increment along the length of said magnetostrictive member;
said pickup member being positioned within said traveling magnetic field; and



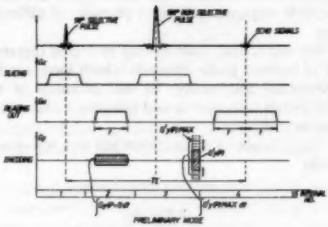
detector means connected to said pickup member to detect the presence and location of a target of flux distorting material adjacent said magnetostrictive member and within said traveling magnetic field at any distance along the length of said magnetostrictive member by using the velocity of the traveling magnetic field and the time interval between the pulsing means and the signal in the detector means resulting from the disturbance of the traveling magnetic field caused by the target.

4,709,211

NUCLEAR MAGNETIC RESONANCE SYSTEM

Yoshio Machida, Nishi-Nasunomachi, and Takao Kasugai, Otawara, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 11, 1986, Ser. No. 884,504
Claims priority, application Japan, Jul. 11, 1985, 60-151342
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—309 **5 Claims**



1. A method of deriving image information from an object using nuclear magnetic resonance signals comprising the steps of:
(A) subjecting an object to a static magnetic field along an axis and performing a set of sequential preliminary steps including:
(1) selectively exciting nuclear spins in a selected plane in the presence of a first gradient magnetic field oriented along said axis;
(2) applying a second gradient magnetic field for encoding the phase of the selected spins to spatially resolve information along another axis being orthogonal to the direction of the first axis;
(3) applying a preliminary third gradient magnetic field having a direction orthogonal to the direction of both the first and second axes;

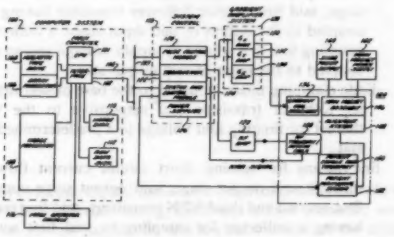
(4) applying a 180° RF pulse associated with the first gradient to produce echo refocusing;
(5) applying an additional preliminary third gradient after said 180° RF pulse;
(6) removing the additional third gradient;
(7) applying a further second gradient;
(8) measuring a spin-echo signal in the presence of said further second gradient;
(9) repeating the sequence of steps (1)–(8) a plurality of times while applying a different value of the preliminary third gradient each time and while storing the respective measured values of the spin-echo signal;
(10) selecting one of said stored values of the spin-echo signal in accordance with a predetermined criteria;
(11) determining the value of said additional preliminary third gradient $G'_y(p)MAX$ which corresponds to said selected value of said spin-echo signal; and
(B) subjecting the object to said static magnetic field and performing the measurement steps of:
(12) selectively exciting nuclear spins in said selected plane in the presence of said first gradient magnetic field;
(13) applying said second gradient magnetic field;
(14) applying a third gradient magnetic field having a direction orthogonal to the direction of both the first and second axes;
(15) applying a 180° RF pulse associated with the first gradient to produce echo refocusing;
(16) applying an additional third gradient after said 180° RF pulse, said additional third gradient having a value $G'_y(p)MAX$ determined in said preliminary steps;
(17) removing the additional third gradient;
(18) applying a further second gradient;
(19) measuring a spin-echo signal in the presence of said further second gradient;
(20) repeating the sequence of steps (12)–(19) a plurality of times while applying a different value of the third gradient in step (14) while storing the respective measured values of the spin-echo signals; and
(21) processing the stored values of the spin-echo signal for determining an NMR image of said object.

4,709,212

METHOD OF ENHANCING IMAGE SIGNAL-TO-NOISE RATIO BY COMBINING NMR IMAGES OF DIFFERING PULSE SEQUENCE TIMING

James R. MacFall, Hartland, and Gary H. Glover, Delafield, both of Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Jan. 3, 1986, Ser. No. 816,014
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—309 **13 Claims**



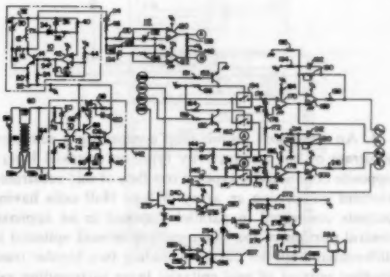
1. A method for generating a computed NMR image having improved signal-to-noise ratio relative to an acquired NMR image corresponding to substantially similar timing parameters, said method comprising the steps of:
exciting, spatially encoding and detecting NMR signals in a sample object to obtain a plurality of acquired images according to a timing parameter which varies between acquired images;
fitting NMR data corresponding to each pixel of said acquired images into an equation relating NMR parameters of said object to said NMR signals in order to produce a plurality of fitted equations; and
generating said computed image corresponding to a single value of said timing parameter using said fitted equations.

4,709,213

METAL DETECTOR HAVING DIGITAL SIGNAL PROCESSING

Robert J. Podhrasky, Dallas, Tex., assignor to Garrett Electronics, Inc., Garland, Tex.

Continuation of Ser. No. 401,378, Jul. 23, 1982, abandoned. This application Jul. 8, 1985, Ser. No. 752,018
Int. Cl.[4] G01V *3/11, 3/65;* G01R *15/08;* H03M *1/06*
U.S. Cl. 324—329 **27 Claims**



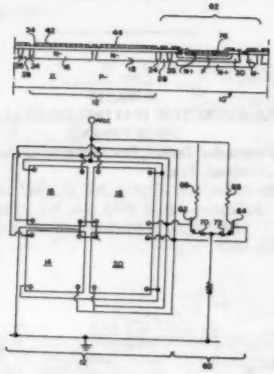
1. A metal detector circuit, comprising:
means for generating an oscillatory signal;
a transmit coil connected to receive said oscillatory signal and generate an electromagnetic field therefrom;
a receive coil located in said electromagnetic field for producing a receive signal due to said electromagnetic field;
means for phase demodulating said receive signal with respect to the phase of said oscillatory signal to produce a phase demodulated signal;
means for digitizing said phase demodulated signal to produce digital signal samples, said means for digitizing having a predetermined amplitude input range for signals received thereby;
digital signal processing means connected to receive said digital signal samples and produce therefrom an output signal in accordance with a stored signal processing program to indicate detection of an object;
means responsive to a digital offset signal produced by said digital signal processing means for generating a corresponding analog offset signal;
means for combining said analog offset signal with said phase demodulated signal;
said digital signal processing means producing said digital offset signal as a fixed amplitude signal when the amplitude of said phase demodulated signal goes beyond said predetermined input range for said means for digitizing as indicated by said digital signal samples received from said means for digitizing, said analog signal driving the signal provided to said means for digitizing to within said predetermined input range; and
means for generating a target indication signal in response to said output signal.

4,709,214

INTEGRATED HALL ELEMENT AND AMPLIFIER WITH CONTROLLED OFFSET VOLTAGE

Jacob K. Higgs, Salisbury, N.H., assignor to Sprague Electric Company, North Adams, Mass.

Filed Apr. 28, 2986, Ser. No. 856,562
Int. Cl.[4] H03F *15/00*
U.S. Cl. 330—6 **6 Claims**



1. An integrated circuit chip comprising a semiconductor substrate of one conductivity type, an epitaxial layer of the opposite conductivity type on one face of said substrate, a Hall element comprising an array of four Hall cells having their outputs connected in parallel disposed in an approximately central portion of the outer surface of said epitaxial layer, a differential amplifier circuit including two bipolar transistors, another portion of said epitaxial layer surrounding said Hall element containing said differential transistors and other circuit components, said Hall element being separated from said transistors and other circuit components by a moat surrounding said Hall element, said moat being comprised of a pair of heavily doped isolation walls of said one conductivity type, having a band of epitaxial material of opposite conductivity therebetween to isolate said Hall element from built-in stresses in said surrounding epitaxial layer portion adjacent to said Hall element, said transistors positioned adjacent to each other and on either side of an axis of said Hall element that runs through the center of said Hall element so that said transistors have equal thermal coupling to said Hall element, each of said transistors having an emitter with an area no less than about thirty percent that of one of said Hall cells.

4,709,215

TRAVELING WAVE TUBE DRIVE CONTROLLER

Robert F. McClanahan, Valencia; Robert Washburn, Malibu, and William Hwang, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

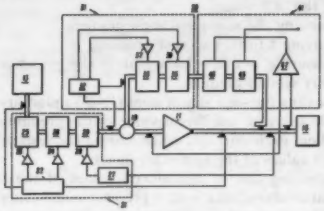
Filed Dec. 30, 1985, Ser. No. 814,546
Int. Cl.[4] H03F *3/58*
U.S. Cl. 330—43 **28 Claims**

6. A method of augmenting the drive from an exciter source to induce a traveling wave tube to drive itself into saturation, comprising:

determining when the traveling wave tube is operating on a non-saturated condition;

feeding back a portion of the traveling wave tube output power to the traveling wave tube input to augment traveling wave tube input power; and

regulating the portion of the traveling wave tube output power being fed back to the traveling wave tube input in response to the operating condition of the traveling wave



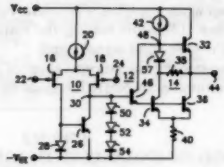
tube to drive the traveling wave tube into a saturated operating condition.

4,709,216

OPERATIONAL AMPLIFIER WITH PASSIVE CURRENT LIMITING

William F. Davis, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 30, 1986, Ser. No. 880,534
Int. Cl.[4] H03F *3/45*
U.S. Cl. 330—252 **6 Claims**



1. An operational amplifier circuit, comprising:

an input stage having first and second inputs for receiving a differential input signal and having an output;

an output stage having an input and having an output terminal;

at least a first emitter follower transistor coupled between the output of said input stage and the input of said output stage, said first emitter follower transistor having a base coupled to the output of said input stage, a collector for coupling to a first source of supply voltage and an emitter coupled to the input of said output stage;

diode clamping means coupled to the base of said first emitter follower transistor and responsive to the voltage thereat for limiting said voltage to a predetermined value; and

first means for sensing short circuit current flowing in through said output stage, said output stage comprising first, second and third NPN transistors, said first transistor having a collector for coupling to said first source of supply voltage and an emitter coupled to said output terminal, said second and third transistors each having a collector coupled to said output terminal, each having a base coupled to the emitter of said emitter follower transistor, and each having an emitter coupled to said first means, the collector of said second transistor being coupled to the base of said first transistor.

4,709,217

DIFFERENTIAL CURRENT AMPLIFIER

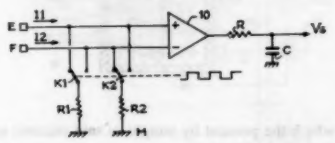
Frederic Lemaire, St. Egreve, France, assignor to Thomson-CSF, Paris, France

Filed Feb. 3, 1986, Ser. No. 825,644

Claims priority, application France, Feb. 5, 1985, 85 01585

Int. Cl.[4] H03F *3/45*

U.S. Cl. 330—258 **4 Claims**



1. In a differential current amplifier having two inputs each receiving a respective input current I1 and I2, so as to produce at the output a signal proportional to the difference of the input currents, comprising a differential voltage amplifer having two inputs, two resistors connected to the same circuit node and having substantially the same value, periodic switching means are provided, actuated with a cyclic ratio close to 0.5 for

(1) during a first half of each cycle, connecting the resistors to the inputs of the differential current amplifier so as to produce across the first resistor R1 a voltage drop varying as R1I1 and across the second resistor R2 a voltage drop varying as R2I2, and connecting the first resistor R1 to a first input of the differential voltage amplifier and the second resistor to a second input of the differential voltage amplifier,

(2) during a second half of each cycle reversing the connections between the resistors and the inputs of the differential current amplifier so as to produce across the first resistor R1 a voltage drop varying as R1I2 and across the second resistor R2 a voltage drop varying as R2I1, and also reversing the connections between the resistors and the inputs of the differential voltage amplifier.

4,709,218

OVERTONE CRYSTAL OSCILLATOR

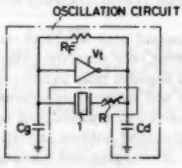
Nakanobu Moritani; Mitsuyuki Sugita; Isamu Hoshino; Hirofumi Yanagi; Hitoshi Ikeno, and Tetsuro Konno, all of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Jul. 15, 1986, Ser. No. 885,930

Claims priority, application Japan, Jul. 15, 1985, 60-155733

Int. Cl.[4] H03B *5/36*

U.S. Cl. 331—116 FE **4 Claims**



1. An overtone crystal oscillator comprising: a crystal vibrator; a CMOS circuit having input and output terminals and being connected parallel to said crystal vibrator at the input and output terminals thereof; and two capacitors connected to the input and output terminals of the CMOS circuit, respectively, the two capacitors having capacitances C_g and C_d determined to satisfy at least one of following two conditions wherein the first condition is that an oscillation starting resistance R_{KN} of a desired N-th overtone of the overtone crystal oscillator is sufficiently larger than an effective resistance R_{QN} of the crystal vibrator oscillating at the N-th overtone, the oscillation starting resistance being expressed by the relation:

$$R_{KN}=K/(\omega^2 \cdot C_g C_d)$$

where ω is the oscillating frequency of the oscillator, K is the constant determined by mutual conductance of the CMOS circuit, and the second condition is that an effective resistance R_{Qn} of said crystal vibrator of an n-th overtone except the desired N-th overtone satisfies the following relation:

$$R_{Qn}>N^2 \cdot R_{KN}/n^2.$$

4,709,219

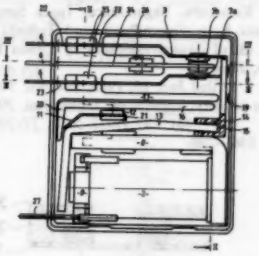
SMALL-SIZE SWITCHING RELAY IN MINIATURE EMBODIMENT

Wolfgang Nestlen, Rottweil, and Reiner Rudolf, Fridingen, both of Fed. Rep. of Germany, assignors to Hengstler GmbH Geschäftsbereich Haller-Relais, Wehingen, Fed. Rep. of Germany

Filed Aug. 10, 1984, Ser. No. 639,427

Int. Cl.[4] H01H *51/08*

U.S. Cl. 335—129 **3 Claims**



1. In a miniaturized electromagnetic relay, the combination of,

a magnet system including an L-shaped armature having a free swivelling end,

a contact system, including contact springs,

a casing,

a cover cooperant with the casing,

the casing defining a spring support for retaining the magnet and contact systems within the casing and cooperant cover,

a rib integral with the cover for separating the magnet and contact systems,

an actuator for actuating the contact springs of the contact system,

the rib being provided with a dogleg for partially surrounding the armature,

the actuator being provided with a pocket for nestably receiving the free swivelling end of the armature.

4,709,220

RADIATION SUPPRESSION DEVICE

Toshihiko Sakane, Hyogo, and Michio Ogasa, Kyoto, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 4, 1986, Ser. No. 903,974

Claims priority, application Japan, Sep. 13, 1985, 60-203779; Oct. 8, 1985, 60-153830; Oct. 17, 1985, 60-232666; Oct. 30, 1985, 60-168601

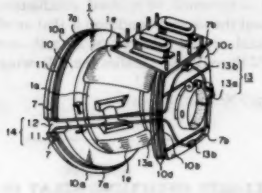
Int. Cl.[4] H01H *5/00*

U.S. Cl. 335—214 **14 Claims**

1. A radiation suppression device for suppressing undesired radiation due to a leak magnetic field produced by a deflecting

coil that is wound around a deflection yoke of a cathode ray tube display unit, said device comprising:

an auxiliary coil connected electrically with said deflecting coil and wound around the outer wall face of said deflection yoke at a position corresponding to the position at which said deflecting coil is wound;



wherein the number of turns and the direction of winding of said auxiliary coil are so selected that the leak magnetic field produced by said deflecting coil is cancelled by the magnetic field produced by said auxiliary coil.

4,709,221

SHEET COIL

Susumu Kadokura, Sagamihara; Ippei Sawayama, Machida; Tomoaki Kato, Sagamihara, and Tadashi Okamoto, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 17, 1985, Ser. No. 745,625

Claims priority, application Japan, Jun. 20, 1984, 59-126974

Int. Cl.[4] H01F *5/00, 27/28*

U.S. Cl. 336—200 **3 Claims**

1. In a sheet coil comprising a conductor in the form of a coil on an insulating substrate, said coil having a side portion extending up from the substrate and defining a gap between adjacent turns of the coil, a mending metal portion deposited at the side portion for narrowing the gap width, the thickness of the deposited metal in the direction of the thickness of the coil being such that the deposited metal does not bulge up over the upper surface of the coil.

4,709,222

FUSE DEVICE

Shigeru Morita, and Yukio Sugaya, both of Yokohama, Japan, assignors to Kabushiki Kaisha S.K.K., Kanagawa, Japan

Continuation of Ser. No. 762,621, Aug. 5, 1985, abandoned. This application Mar. 9, 1987, Ser. No. 23,703

Claims priority, application Japan, Aug. 6, 1984, 59-163815

Int. Cl.[4] H01H *85/38, 85/18*

U.S. Cl. 337—273 **1 Claim**

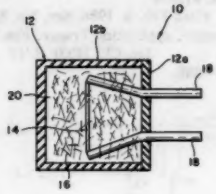
1. A fuse device comprising:

a casing of a nonconductive material having a base portion and a cap portion to define a chamber in cooperation with the base portion;

a pair of electrode pins penetrating said base portion and projecting outward from the inside of said casing;

a fuse element accommodated in said casing and electrically connecting each other the sides of the portions inside said casing of said electrode pins; and

an arc-extinguishing agent accommodated in said casing and consisting of a fibrous or powdery nonconductive material, said arc-extinguishing agent being obtained by overheating a mixture of ceramic and alumina to fuse same directly or by solvent, said ceramic being mainly of silicon, and by solidifying the fused mixture into fibrous state,



in which the percent by weight of said ceramic is smaller than that of said alumina.

4,709,223

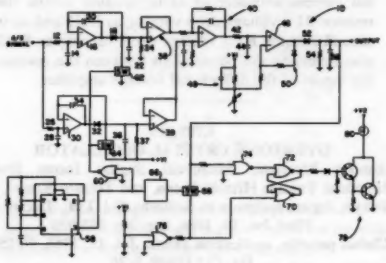
ANTISKID SYSTEM MONITORING CIRCUIT

Angelo T. Crapanzano, Akron, Ohio, assignor to Loral Corporation, New York, N.Y.

Filed Dec. 30, 1985, Ser. No. 814,833

Int. Cl.[4] B60Q *1/00*

U.S. Cl. 340—52 B **6 Claims**



1. An antiskid system efficiency monitoring circuit, comprising:

first and second peak detectors receiving an antiskid signal and respectively generating therefrom positive peak signals and negative peak signals corresponding to maximum positive and negative excursions of said antiskid signal, said positive and negative peak signals charging respective first and second holding circuits;

means for discharging said first and second holding circuits at a first fixed frequency;

a differential amplifier receiving said positive and negative peak signals and generating a differential signal corresponding to the difference between said positive and negative peak signals; and

a threshold detector receiving said differential signal and producing an output signal when said differential signal exceeds a particular level, said output signal of said threshold detector being fed to charge a third holding circuit, said charge on said third holding circuit being periodically gated to a latch at a second fixed frequency less than said first fixed frequency.

4,709,224

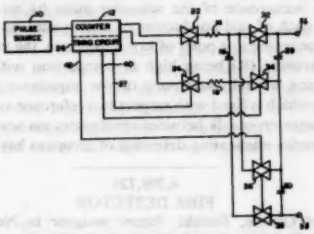
DIGITAL-TO-ANALOG CONVERTER

David Fiori, Jr., 140 Dollington Rd., Yardley, Pa. 19067

Continuation-in-part of Ser. No. 800,984, Nov. 22, 1985, abandoned. This application Nov. 6, 1986, Ser. No. 925,022

Int. Cl.[4] H03M 1/82

U.S. Cl. 340—347 DA 21 Claims



1. A digital-to-analog converter for developing an analog output representative of the difference between two digital inputs, said converter comprising:

input signal means for supplying a first series of input pulses having a repetition rate representative of a first digital input and a second series of input pulses having a repetition rate representative of a second digital input;

counter means responsive to said input pulses for developing a counter signal composed of a first counter pulse having a duration representative of the time required to count a prescribed number of pulses of said first series and a second counter pulse, oppositely directed to said first counter pulse, having a duration representative of the time required to count the same number of pulses of said second series;

integrating means responsive to said counter signal for developing an integration signal composed of a rising portion developed from said first counter pulse and a decaying portion developed from said second counter pulse;

first switching means for selectively connecting said counter means to said integrating means;

a capacitor;

second switching means for selectively connecting said integrating means to said capacitor;

and timing means for supplying (a) a first control signal to said first switching means to disconnect said counter means from said integrating means and interrupt development of said integration signal, and (b) a second control signal to said second switching means to connect said integrating means to said capacitor to transfer the level of said integration signal to said capacitor during selected interruptions of the development of said integration signal.

4,709,225

SELF-CALIBRATION METHOD FOR CAPACITORS IN A MONOLITHIC INTEGRATED CIRCUIT

David R. Welland, and Michael J. Callahan, both of Austin, Tex., assignors to Crystal Semiconductor Corporation, Austin, Tex.

Filed Dec. 16, 1985, Ser. No. 809,530

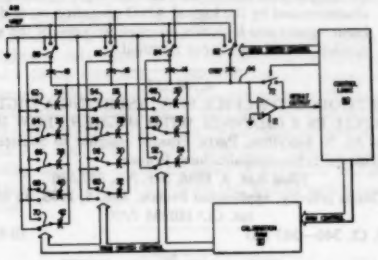
Int. Cl.[4] H03M 1/10

U.S. Cl. 340—347 CC 4 Claims

4. A method of interleaved operation and calibration of an analog-to-digital converter of the successive approximation charge redistribution type, said analog-to-digital converter including a set of primary capacitors and at least one set of trim capacitors individually connectable to one of said primary capacitors, comprising:

a. determining whether a preselected one of said trim capacitors should be connected in parallel with said primary capacitor for calibrating the capacitance of said primary capacitor, and connecting or not connecting said trim capacitor accordingly; then

b. generating a digital code representative of an analog input signal by performing an analog-to-digital conversion cycle; and



c. repeating steps a and b for a different preselected one of said trim capacitors until a connect or not connect determination has been made for each of said trim capacitors.

4,709,226

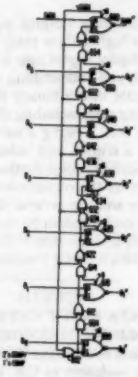
CIRCUITRY FOR COMPLEMENTING BINARY NUMBERS

Lauren A. Christopher, Hopewell, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Jul. 15, 1985, Ser. No. 755,011

Int. Cl.[4] H03M 7/00

U.S. Cl. 340—347 DD 10 Claims



1. Apparatus having N stages, N being a positive integer, for developing the arithmetic complement of binary values having N bits, each of said values having a sign bit which represents the polarity of the value, wherein one stage of said apparatus comprises:

a data input terminal for applying signals representing one bit of said binary values;

a data output terminal for providing signals representing the corresponding bit of said complemented binary values;

a carry input terminal for applying carry input signals to said stage;

a carry output terminal for providing carry output signals from said stage;

first combinatorial logic circuitry having a first input electrode coupled to said data input terminal, a second input electrode coupled to said carry input terminal and an output electrode coupled to said data output terminal, the output function of said first logic circuitry being characterized by the logical exclusive NOR operation on said carry input signals and the signals applied to said data input terminal; and

second combinatorial logic circuitry having a first input electrode coupled to said data input terminal, a second

input electrode coupled to said carry input terminal and an output electrode coupled to said carry output terminal, the output function of said second logic circuitry being characterized by the logical AND operation on said carry input signals and logically inverted versions of the signals applied to said data input terminal.

4,709,227

METHOD AND DEVICE FOR INSERTING A DIGITAL SIGNAL IN A CHANNEL WITH HIGHER FLOW RATE

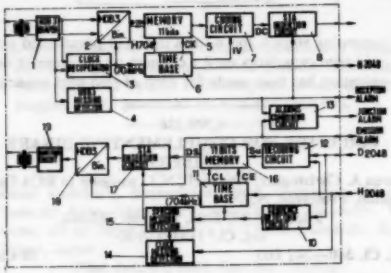
Yves M. N. Guerillot, Paris, France, assignor to Societe Anonyme de Telecommunications, France

Filed Apr. 3, 1986, Ser. No. 847,636

Claims priority, application France, Apr. 4, 1985, 85 05155

Int. Cl.[4] H03M *7/00*

U.S. Cl. 340—347 DD **10 Claims**



1. A method of inserting a digital signal at a given flow rate in a channel with a higher flow rate, comprising the steps of: transforming said digital signal into a binary signal associated with a clock signal; and transcribing said binary signal at the lower given flow rate into a binary signal at the higher flow rate, said transcribing step including the step of substituting, in each sequence of n bits, n being a natural integer, each of the first (n−1) bits by a triplet, and substituting the last bit by a doublet, said transcribing step further including the step of forming each triplet by the repetition of the bit to be transmitted for the first two and the inverse thereof for the third, and the step of forming each doublet by the simple repetition of the bit to be transmitted, and the step of forming the sequence thus transcribed with p bits, p being a natural integer greater than n.

4,709,228

ELECTRONIC DATA INPUT KEYBOARD COMPRISING KEYS PROVIDED WITH CONDUCTIVE CONTACTS

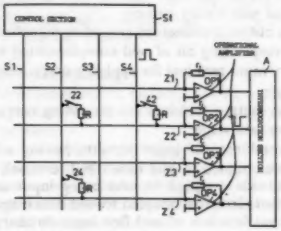
Ernst E. Hücking, and Karl-Heinz Klemmt, both of Siegen, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 8, 1985, Ser. No. 720,787

Claims priority, application Fed. Rep. of Germany, Aug. 9, 1984, 3429309

Int. Cl.[4] G06F *3/02*

U.S. Cl. 340—365 S **7 Claims**



1. An electronic data input keyboard with n-key rollover comprising a plurality of keys provided with conductive contacts, each key being associated with a crosspoint of a current-controlled conductor matrix having a plurality of column conductors and a plurality of row conductors, each key coupling upon actuation, the column conductor to the row conductor of said associated crosspoint through an ohmic resistor (R) which is connected in series with said conductive contact of said key, the conductors of one matrix coordinate successively receiving a scanning pulse from a control circuit, the conductors of the other matrix coordinate being monitored for the occurrence of the scanning pulse by an evaluation circuit, each of said conductors of said monitored coordinate being connected to a point of low impedance, the value of said ohmic resistor (R) being high in comparison with said low impedance, whereby said point of low impedance is kept at a voltage which is fixed with respect to a reference voltage so as to minimize cross-talk between conductors via several closed keys thereby eliminating detection of phantom keys.

4,709,229

FIRE DETECTOR

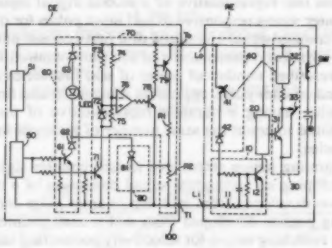
Hidenori Otsuka, Ibaraki, Japan, assignor to Nohmi Bosai Kogyo Co., Ltd., Tokyo, Japan

Filed Feb. 26, 1986, Ser. No. 833,893

Claims priority, application Japan, Feb. 27, 1985, 60-38371; Feb. 27, 1985, 60-38372

Int. Cl.[4] G08B *17/00, 17/06, 17/10*

U.S. Cl. 340—540 **7 Claims**



1. Fire detection apparatus comprising non-latching fire detecting means for detecting a fire phenomenon of above a predetermined level, fire signal transmission means controlled by the fire detecting means for transmitting a fire signal when such a fire is being detected, means for receiving the fire signal and including: means for accumulating the fire signal, means for setting off a fire alarm when the fire signal has been continuously detected for a predetermined length of time, fire indication means having an "ON" state for visual indication of a fire signal, and control signal means responsive to the accumulating means for latching the fire indication means in the "ON" state after the fire signal has been continuously detected for said predetermined length of time so that the fire indication means persists in that state until reset.

4,709,230

COLOR CONVERTER

James J. Popowski, Chicago, and Richard Goldstein, Northbrook, both of Ill., assignors to Questron, Inc., Northbrook, Ill.

Filed Apr. 19, 1985, Ser. No. 725,009

Int. Cl.[4] G09G *1/28*

U.S. Cl. 340—703 **27 Claims**

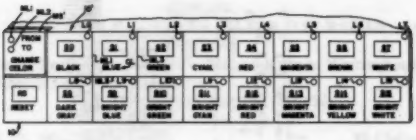
1. A color converter apparatus adapted to be interposed between the output of a signal source providing pattern-generating signals and a display device capable of producing visible multi-color display patterns in the form of picture element segments colored responsively to color control commands supplied sequentially thereto, the signal source providing for a finite plurality of source color control commands to be used in generating individual picture element segments of said pattern by said display device, said apparatus comprising:

input terminal means adapted to receive said source color control commands from said signal source;

output terminal means adapted to provide color commands to said display device;

detecting means coupled to said input terminal means for distinguishingly detecting among a plurality of different input color control commands as they sequentially appear at said input terminal means;

selecting means including manual switching means for selecting from a finite number of generatable color control commands at least a first second output color control command different from each other and different from said detected input color commands, each to be respectively generated responsively to the detected presence of a different one of said detected input color control commands;



means including generating means responsive to said detecting means and said selecting means for respectively generating said output color control commands responsively to the detected presence of said detected input color control commands and for coupling said output color control commands to said output terminal means; and

indicator means for visually identifying which of said finite plurality of input color control commands have been detected by said detecting means, said indicator means including a plurality of visible display elements including means responsively coupled to said detecting means for selectively actuating each said display element responsively to the detection of a different one of said detectable input color control commands.

4,709,231

SHADING APPARATUS FOR DISPLAYING THREE DIMENSIONAL OBJECTS

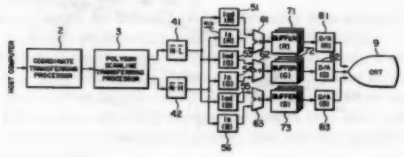
Toru Sakaibara, Kokubunji; Shigeo Tsujioka, Higashiyamato; Toshinori Kajiura, Kawasaki; Toshihisa Aoshima, Tokyo, and Motonobu Tonomura, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 19, 1985, Ser. No. 766,941

Claims priority, application Japan, Sep. 14, 1984, 59-191490

Int. Cl.⁴ G09G *1/06*

U.S. Cl. 340—729 **7 Claims**



1. A pattern shading apparatus comprising:

means for obtaining a first signal indicative of a relation among the direction of a normal, the direction of a light source and the direction of a view point each viewed at a point within a polygon having a plurality of vertices, on the basis of the position of said point in said polygon and the direction of a normal at each of said vertices;

a table for holding a series of brightness data, said brightness data being previously calculated for a series of values of said first signal, said table being searched on the basis of said first signal; and

means of converting the result obtained by the table search into a signal used in display means;

wherein said table includes a first table for holding a series of brightness data based upon a reflection of ambient light and a diffuse reflection of light from the light source and a second table for holding a series of brightness data based upon a specular reflection of light from the light source, and said first and second tables are searched on the basis of said first signal, and wherein said table further includes adding means for adding the result of search for said first table and the result of search for said second table to each other.

4,709,232

MATRIX TRANSCODING SYSTEM IN VIDEOTEXT SYSTEMS

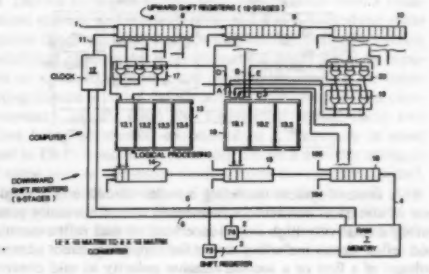
Alain A. Leger, Betton, France, assignor to Etablissement Public de Diffusion dit Telediffusion de France, France

Filed Dec. 16, 1983, Ser. No. 562,431

Claims priority, application France, Dec. 29, 1982, 82 22225

Int. Cl.⁴ G09G *1/06*

U.S. Cl. 340—731 **7 Claims**



1. The system for transcoding in two phases the signals of a 12×10 dot matrix into signals of an 8×10 dot matrix, wherein the transcoding system comprises

first means operating in a first phase for arranging initial pixels of each line in said 12×10 matrix in groups of three, the arranged pixels remaining in their natural order, and for logically processing each group of three initial pixels to obtain a group of two converted pixels; and

second means operating in a second phase and having analyzing means for analyzing an initial four pixel boundary block which spans an interspace boundary between two adjacent three pixel groups, and calculating means which is responsive to said analyzing means and which

(i) is effective when the boundary block is different from 0110 for retaining as final a corresponding converted block of two boundary pixels converted in the first phase, said two pixels being those which are on either side of the interspace boundary, and

(ii) which is effective when said four pixel boundary block is 0110 for analyzing the configuration of the initial four pixel boundary block belonging to the last previous line to revise the converted block;

said calculating means including:

(a) means responsive to said boundary block of the previous line being 0110 for replacing the pixels of the converted block with the corresponding finally converted pixels of the last previous line.

(b) means responsive to the previous line's boundary block being neither 0110 nor 0000 for calculating first substitute pixels in response to the initial pixels in the current line and in the last previous line which are most closely re-

lated, and for replacing the pixels of the converted block by the first substitute pixels, and

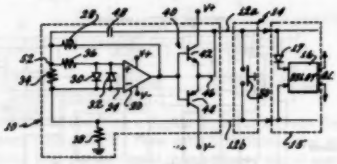
(c) means responsive to the previous line's boundary block being equal to 0000 for analyzing the corresponding initial four pixel boundary block in the next succeeding line, and responsive to said analysis when the next line's boundary block is equal to 0000 or 0110 for replacing the two adjacent boundary pixels of the converted block by 1 and 1, and means responsive to said analysis when said boundary block of the next line is neither 0000 nor 0110 for calculating second substitute pixels in response to the initial pixels in the current line and in the next succeeding line which are most closely related, and for replacing the pixels of the converted block by the second substitute pixels.

4,709,233

SINGLE LINE PAIR POWER CONTROL SYSTEM WITH MULTI-STATION CAPABILITY

David R. Duval, 1523 Plaza Del Amo, #6, Torrance, Calif. 90501

Filed May 27, 1983, Ser. No. 498,645
Int. Cl.[4] H04Q *1/00*
U.S. Cl. 340—825.18 55 Claims



1. A control system including a reflex circuit and a single pair of electrical conductors connected to and normally presenting a relatively high impedance load to said reflex circuit, said reflex circuit including means for supplying direct current voltage of a first or a second relative polarity to said control line pair, and means for reversing the relative polarity of said direct current voltage from one of said relative polarities to the other of said relative polarities in response to a momentary drop in the voltage difference between said conductor pair induced by switch means connected between said conductor pair for momentarily establishing a low-impedance path between said control lines, said reflex circuit maintaining said reversed relative polarity following removal of said momentary low impedance path, said conductor pair being switchable back and forth between said first and second relative polarities responsive to repeated actuation of said same switch means momentarily establishing said low impedance path.

4,709,234

POWER-CONSERVING SELF-CONTAINED DOWNHOLE GAUGE SYSTEM

Gilbert H. Forehand; Michael J. Lynch; Richard L. Duncan; Stephen E. Tilghman, and Jack C. Penn, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed May 6, 1985, Ser. No. 731,240
Int. Cl.[4] G01V *1/00;* G06F *46/48*
U.S. Cl. 340—856 11 Claims

1. A power-conserving apparatus for detecting an environmental condition in a well bore, comprising:

first circuit means, responsive to a detected environmental condition and to a first switchable power signal, for converting the detected environmental condition into electrical signals;

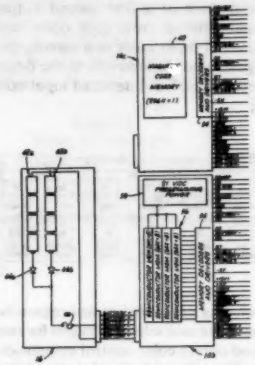
second circuit means, connected to said first circuit means and responsive to a second switchable power signal, for converting said electrical signals into digital signals quantifying the detected environmental condition;

third circuit means, connected to said second circuit means and responsive to a third switchable power signal, for converting said digital signals into memory information signals, said third circuit means including:

means for generating said first switchable power signal;

means for generating said second switchable power signal separate from said first switchable power signal;

means for generating a fourth switchable power signal separate from said first and second switchable power signals; and



means for providing a signal designating a selected time period has expired;

fourth circuit means, connected to said third circuit means and responsive to said fourth switchable power signal, for storing said memory information signals; and

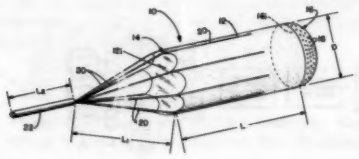
fifth circuit means, connected to said third circuit means, for generating said third switchable power signal in response to said signal designating a selected time period has expired.

4,709,235

LOW-DRAG, RAM-AIR INFLATED, MILLIMETER WAVE, PASSIVE RADAR DECOY

John J. Graham, Jr.; Joseph C. Huber, Jr., both of Cuyahoga Falls, and John E. Neumann, Uniontown, all of Ohio, assignors to Loral Corporation, New York, N.Y.

Filed Nov. 14, 1986, Ser. No. 930,627
Int. Cl.[4] H01Q *15/00*
U.S. Cl. 342—10 9 Claims



1. An aircraft-launched countermeasures passive radar decoy providing an increased radar reflection and doppler frequency return to a ground-based radar upon being ejected by the aircraft, comprises in combination:

a substantially cylindrically-shaped, lightweight, ram-air inflatable, fabric-reinforced composite body having an open forward end and a substantially hemispherically-shaped closed rearward end, the forward end adapted for receiving ram-air to inflate the body and said fabric reinforcement comprising a leno-woven scrim fabric exhibit-

ing a weight within the range of 0.25–1.25 oz/yd^2 (8.5–42.4 gms/m^2);

a small-diameter, rod-shaped weight positioned ahead of the forward end of the body and exhibiting the highest weight-to-drag-area ratio required for the most effective aerodynamic effect when the composite body is inflated and in a free-fall flight;

a plurality of shroud lines affixed to the body and the weight to provide a spaced-apart interconnection between the two; and

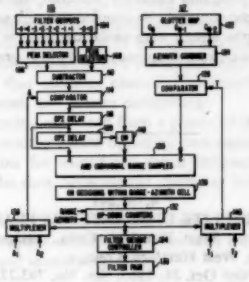
a radar-reflective coating on at least all inside surfaces of the body to provide a high radar cross-section and broad-angle coverage to a ground-based radar when the body is inflated upon ejection by the aircraft.

4,709,236

SELECTABLE DOPPLER FILTER FOR RADAR SYSTEMS

John W. Taylor, Jr., Baltimore, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 8, 1985, Ser. No. 731,696
Int. Cl.^{4} G01S *7/66*
U.S. Cl. 342—101 **19 Claims**



1. A filter arrangement for radar systems, said filter arrangement comprising:

first filtering means for providing a first predetermined frequency response;

second filtering means for providing a second predetermined frequency response, said second response being different than said first response;

first means for detecting when a plurality of radar echoes from a specific spatial location have a mean doppler shift substantially equal to zero;

second means for detecting when the radar echoes have an amplitude greater than a first predetermined value;

means for selecting said second filtering means only if said first detecting means determines that said radar echoes have a mean doppler shift substantially equal to zero and said second detecting means determines that said radar echoes have an amplitude greater than said first predetermined value;

wherein the first and second filtering means each comprises a bank of filters having similar passbands and wherein the first detecting means includes means for sensing the outputs of said first or second filtering means; and

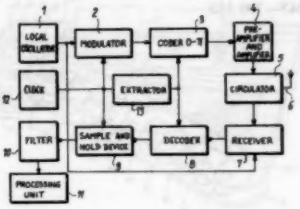
wherein the means for sensing the filtering means outputs compares the echo signal from zero filters to the peak echo signal from non-zero filters, and provides an indication of detection when zero filter echo signal exceeds the non-zero filter peak echo signal by a second predetermined value.

4,709,237

DEVICE FOR ELIMINATING LOW FREQUENCY NOISE FROM A TRANSMISSION SYSTEM, IN PARTICULAR 1/F NOISE IN A HOMODYNE RADAR RECEIVER

Michel Poullain, Meudon, and Alain Marcuard, Bievres, both of France, assignors to LMT Radio Professionnelle, Boulogne Billancourt, France

Filed Dec. 3, 1985, Ser. No. 803,977
Claims priority, application France, Dec. 6, 1984, 84 18642
Int. Cl.^{4} G01S *7/28*
U.S. Cl. 342—203 **6 Claims**



1. Device for eliminating low frequency noise from a transmission system, in particular noise in 1/f in a homodyne radar receiver the transmitted signal which is a frequency Fo carrier, modulated, chopped at a repetition frequency PRF by time-slots of width to, wherein said device comprises in the transmitting circuit a coder device acting, according to two complementary values, upon the transmitted signal, these two values being alternately introduced at a frequency at most equal to PRF/2 and in the receiving circuit a decoder acting in the same way as the coder device, upon the receiving signal, wherein the coder device and the decoder device each comprise a phase coder for phase shifting alternately by 0 and π, the transmitted and the received signal, respectively, and followed by a sample-and-hold device and a low-pass

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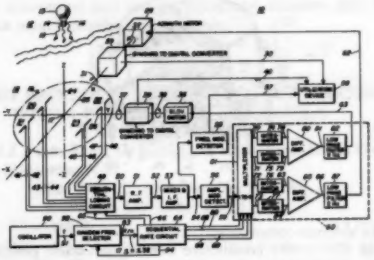
4,709,238

SEQUENTIAL MONO-LOBE TRACKER

Norman Green, Phoenix, Md., assignor to Allied Corporation, Morristown, N.J.

Filed Apr. 27, 1984, Ser. No. 604,678
Int. Cl.^{4} G01S *3/44*
U.S. Cl. 342—427 **9 Claims**



1. A method for passively tracking a target emitting periodic amplitude modulated radio signals without induced tracking errors from said radio signals comprising the steps of non-periodic antenna scanning by shifting the boresight of an antenna from a first to a second position and back at each of a sequence of frequencies, developing amplitude signals indicative of the power of the radio signals received in the first and second positions, generating an error signal in response to the amplitude signals, and positioning the antenna in response to said

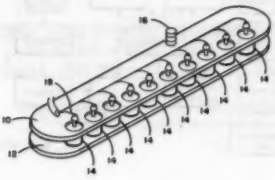
error signal, said step of non-periodic antenna scanning includes the step of randomly selecting said sequence of frequencies from a plurality of predetermined frequencies whereby the dwell time of said boresight in each respective position is non-periodic.

4,709,239

DIPATCH ANTENNA

David L. Herrick, Hudson, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Sep. 9, 1985, Ser. No. 773,699
Int. Cl.[4] H01Q *1/38, 1/28*
U.S. Cl. 343—700 MS **9 Claims**



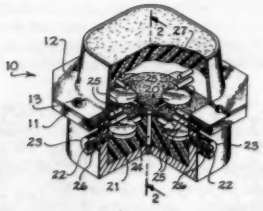
1. An antenna, comprising:
a first radiating element in the form of a conductive patch;
a second radiating element in the form of a conductive patch, juxtaposed substantially parallel with the first conductive patch along its major axis, so as to form an electrical image of said first radiating element; and
a plurality of electronically switchable shorting means having a control input, disposed substantially linearly along and parallel to the major axes of said first radiating and said second radiating element, and operably connected to said first radiating element and said second radiating element.

4,709,240

RUGGED MULTIMODE ANTENNA

John R. P. Bordenave, Morgan Hill, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed May 6, 1985, Ser. No. 730,521
Int. Cl.[4] H01Q *1/28, 1/40, 3/24, 13/08*
U.S. Cl. 343—772 **20 Claims**



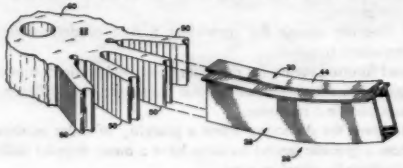
1. An antenna comprising:
(a) an electrically conductive housing structure generally symmetrical about a cylindrical axis, said housing structure including:
(i) a cup-like base member, said base member having a generally square-shaped cross-sectional configuration in a plane perpendicular to said cylindrical axis, said base member having an outwardly flanged rim portion; and
(ii) a chimney member, a first end of said chimney member being outwardly flanged to abut said flanged rim portion of said base member, said flanged first end of said chimney member being attached to said flanged rim portion of said base member so that said base member and said chimney member together form a resonant cavity, a second end of said chimney member defining a squarish aperture with curved corners, said chimney member tapering inwardly with respect to said cylindrical axis from said first end attached to said base member to said second end defining said aperture, each side of said aperture being shorter than one-half a specified longest free-space wavelength for said antenna;
(b) a plurality of probes mounted in said cavity, said probes functioning to couple electromagnetic energy through said aperture at free-space wavelengths longer than twice said side of said aperture;
(c) means for energizing selected ones of said probes to enable said electromagnetic energy coupled through said aperture to have a selected polarization;
(d) a plurality of mode suppressors mounted in said cavity, said mode suppressors functioning to prevent spurious modes of said electromagnetic energy from developing in said antenna;
(e) an isolation post mounted in said cavity along said cylindrical axis, said isolation post functioning to control cross-polarization of said electromagnetic energy coupled through said aperture; and
(f) dielectric material within said cavity substantially surrounding said probes, said mode suppressors and said isolation post; said dielectric material enabling said electromagnetic energy to be coupled through said aperture at wavelengths longer than twice said side of said aperture over a continuous frequency bandwidth greater than one ocatve.

4,709,241

SATELLITE DISH ANTENNA FRAME

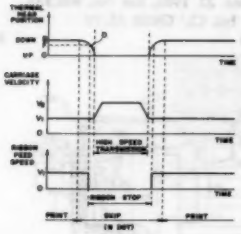
Paul R. Cusson, West Hartford, Conn., assignor to N.S.M. Corporation, West Hartford, Conn.

Filed Oct. 31, 1985, Ser. No. 793,223
Int. Cl.[4] H01Q *15/14, 15/20*
U.S. Cl. 343—916 **2 Claims**



1. A central hub for use in a dish antenna frame having an outer rim and a plurality of angularly spaced, tubular spokes extending radially between the hub and outer rim, said hub comprising: a one-piece extrusion transverse section having a central portion and a plurality of angularly spaced, spoke mounting fingers, each finger receiving a respective one of the plurality of tubular spokes, extending integrally radially outwardly from said central portion, each spoke mounting finger being generally rectangular in transverse section and having circumferentially oppositely facing sides with extruded spoke retention teeth on at least one of the sides for rigidly retaining the respective tubular spoke in overlapping relation on the spoke mounting finger, wherein said central portion of the hub comprises a plurality of extruded, angularly spaced, radially outwardly opening, partially circular, fastener mounting grooves intermediate the spoke mounting fingers and forming openings for hub mounting fasteners.

4,709,242
PRINTER
Yoshio Uchikata; Mineo Nozaki, both of Kawasaki; Masasumi Nagashima, Yokosuka, and Osamu Asakura, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 801,493, Nov. 22, 1985, abandoned, which is a continuation of Ser. No. 750,987, Jul. 1, 1985, abandoned, which is a continuation of Ser. No. 490,159, Apr. 29, 1983, abandoned. This application Feb. 17, 1987, Ser. No. 15,307
Claims priority, application Japan, May 7, 1982, 57-75110
Int. Cl.[4] G01D *15/10*
U.S. Cl. 346—76 PH 46 Claims



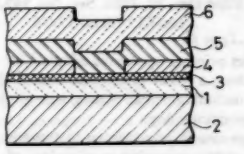
1. A printer having a carriage carrying thereon a head and an ink ribbon, capable of feeding said ink ribbon in a direction opposite to the running direction of said carriage and transferring the ink of said ink ribbon to a recording sheet in accordance with data that includes character information to be supplied to said head, said printer comprising:

means for separating said head from a platen of the printer, said head separating means including cam means;

identifying means for identifying sapce information, also included in the data, between the character information; and

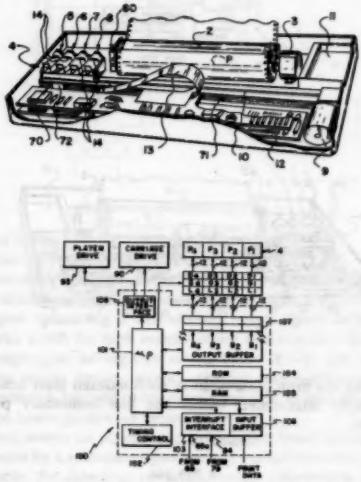
control means for effecting said head's separation from the platen and stoppage of said ink ribbon feed for the space detected by said identifying means.

4,709,243
THERMAL HEAD AND METHOD FOR MANUFACTURE THEREOF
Masakazu Kato, and Takehiro Takoshima, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan
Filed Oct. 23, 1985, Ser. No. 790,415
Claims priority, application Japan, Oct. 23, 1984, 59-221244
Int. Cl.[4] G01D *15/10*
U.S. Cl. 346—76 PH 4 Claims



1. A thermal head having a heat-generating resistor layer, a power feeding conductor layer, and a protective layer superposed on an electrically insulating layer, characterized by the fact that said heat-generating resistor layer is formed of ternary alloy consisting of tantalum, a high-melting metal, and nitrogen.

4,709,244
SYSTEM FOR DETERMINING ORIFICE INTERSPACINGS OF COOPERATIVE INK JET PRINT/CARTRIDGES
Michael J. Piatt, Enon; James T. Theodoras, II, Xenia, and Randy Ray, Miamisburg, all of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Dec. 22, 1986, Ser. No. 945,137
Int. Cl.[4] G01D *15/16*
U.S. Cl. 346—140 R 10 Claims



1. In ink jet printing apparatus of the type having a carriage means for traversing a printing zone and for removably receiving a plurality of print/cartridges with their respective orifice arrays in a transversely spaced relation, a system for use in coordinating the printing of such received print/cartridges comprising:

(a) scan means for signalling the precise relative transverse locations of predetermined print/cartridge features; and

(b) means, responsive to signal inputs from the scan means, for computing and storing horizontal location data for each print/cartridge orifice array.

4,709,245
INK JET PRINTER FOR COOPERATIVELY PRINTING WITH A PLURALITY OF INSERTABLE PRINT/CARTRIDGES
Michael J. Piatt, Enon, Ohio, assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Dec. 22, 1986, Ser. No. 945,136
Int. Cl.[4] G01D *15/16*
U.S. Cl. 346—140 R 10 Claims

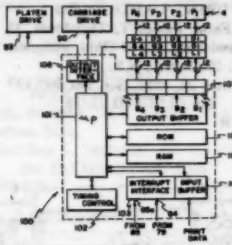
1. Ink jet printing apparatus for printing along a linear print zone with a plurality of traversing print heads, each including linear orifice arrays, said apparatus comprising:

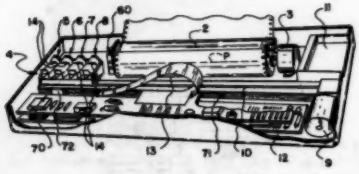
(a) carriage means for traversing said print zone and for receiving and physically indexing a plurality of such print heads in a transversely spaced relation with their orifice arrays precisely perpendicular to the direction of carriage traverse and in precise vertical inter-alignment based on said direction of carriage traverse;

(b) means for detecting and storing the relative transverse locations of indexed orifice arrays; and

(c) means for controlling the printing actuations of each

indexed print head in accordance with its detected transverse location;





whereby the drop placements of such indexed print heads are accurately interrelated within the line commonly printed thereby.

4,709,246

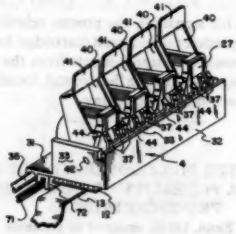
ADJUSTABLE PRINT/CARTRIDGE INK JET PRINTER

Michael J. Piatt, Enon, and Kevin L. Houser, Kettering, both of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 22, 1986, Ser. No. 945,121

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **16 Claims**



1. In ink jet printing apparatus having means for feeding successive line portions of a print medium past a linear print zone, an adjustable printing system comprising:

(a) a plurality of substantially identical print/cartridges each having an ink reservoir, an array of drop ejection elements and an orifice plate including: (i) an array of orifices located in a precisely interspaced relation and (ii) a detent means precisely located with respect to said orifice array;

(b) carriage means for insertably supporting said print/cartridges and for traversing them along said print zone in a direction substantially perpendicular to the direction of print medium feed; and

(c) a plurality of adjustable index means, coupled to said carriage means, for respectively positioning the detent means of inserted print/cartridges selectively at one of a plurality of predetermined vertical locations relative to the direction of carriage means traverse,

whereby the printing droplets from the orifice arrays of inserted and indexed print/cartridges can be selectively; (i) vertically interlaced or (ii) in register during a printing traverse of said carriage.

4,709,247

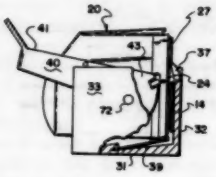
HIGH RESOLUTION, PRINT/CARTRIDGE INK, JET PRINTER

Michael J. Piatt, Enon, and Kevin L. Houser, Kettering, both of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 22, 1986, Ser. No. 945,133

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **20 Claims**



1. In ink jet printing apparatus having means for feeding successive line portions of a print medium past a linear print zone, a high resolution print system comprising:

(a) a plurality of substantially identical print/cartridges each having an ink reservoir, an array of drop ejection elements and an orifice plate including: (i) an array of orifices located in a precisely interspaced relation and (ii) a detent means precisely located with respect to said orifice array;

(b) carriage means for insertably supporting said print/cartridges and for traversing them along said print zone in a direction substantially perpendicular to the direction of print medium feed; and

(c) a plurality of index means, coupled to said carriage means, for respectively positioning the detent means of inserted print/cartridges at predetermined locations that are precisely vertically offset relative to the direction of carriage means traverse,

whereby the printing droplets from the vertically offset orifice arrays of inserted and indexed print/cartridges will be vertically interlaced in each printing traverse of said carriage.

4,709,248

TRANSVERSE PRINTING CONTROL SYSTEM FOR MULTIPLE PRINT/CARTRIDGE PRINTER

Michael J. Piatt, Enon, and Randy Ray, Miamisburg, both of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 22, 1986, Ser. No. 945,138

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **8 Claims**

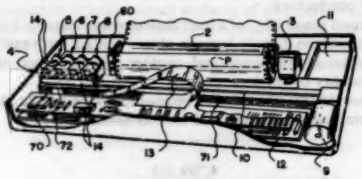
1. In ink jet printing apparatus adapted for printing successive pixels along a linear print zone with a plurality of print-/cartridges, including orifice arrays, a drop placement coordination system comprising:

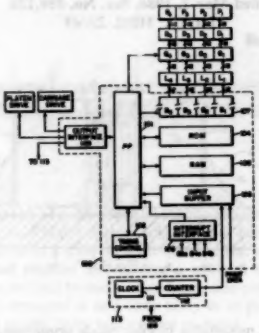
(a) carriage means, constructed to traverse said print zone, for insertably receiving a plurality of such print/cartridges with their orifice arrays spaced in the direction of carriage traverse;

(b) means for determining and storing data representing the transverse inter-spacings of such orifice arrays in the form of pixel-count and intra-pixel phase information; and

(c) means for controlling the actuations of each received print/cartridge in accordance with said stored data, said

controlling means including gate means for sequencing the provision of printing information signals to each print-





/cartridge on the basis of particular pixel-count, interspacing data.

4,709,249

INK JET RECORDER HAVING INK CONTAINER VENT BLOCKING MEANS

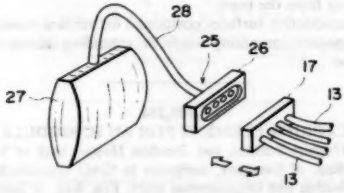
Takayoshi Hanagata, Yamato, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 10, 1985, Ser. No. 742,799

Claims priority, application Japan, Jun. 21, 1984, 59-128247; Jun. 21, 1984, 59-128249

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **1 Claim**



1. An ink jet recorder comprising:

an ink container having a vent path;

a recording head mounted on a carriage that is moveable relative to a recording medium between a stand-by position and a recording position, wherein said ink container is arranged for supplying ink to said recording head and said recording head is adapted to be responsive to a recording signal for discharging the ink toward the recording medium; and

vent blocking means having a variable volume air chamber for blocking said vent path from communication with the atmosphere when the carriage is in the stand-by position.

4,709,250

IMAGE FORMING APPARATUS

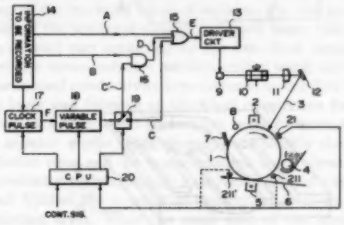
Akihiko Takeuchi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 14, 1986, Ser. No. 829,754

Claims priority, application Japan, Feb. 19, 1985, 60-31036; Feb. 19, 1985, 60-31037; Feb. 19, 1985, 60-31038; Feb. 19, 1985, 60-31039

Int. Cl.[4] G03G *15/04*; G01D *15/14*

U.S. Cl. 346—160 **8 Claims**



1. An image forming apparatus comprising:

an electrophotographic photosensitive member;

information beam generating means for generating an information beam modulated in accordance with a modulation signal containing a first density image signal having a pulse width for high image density and a second density image signal having a pulse width shorter than that of the first image density signal, wherein said photosensitive member is exposed to the beam generated by said information beam generating means; and

control means for driving said information beam generating means by a reference signal having a predetermined pulse width, for detecting an image density information of an image formed by the beam modulated in accordance with the reference signal, and for controlling the pulse width of said second density image signal in response to the detection.

4,709,251

DOUBLE SCHOTTKY-GATE FIELD EFFECT TRANSISTOR

Tomihiro Suzuki, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Japan

Filed Aug. 21, 1985, Ser. No. 768,486

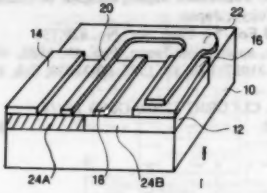
Claims priority, application Japan, Aug. 27, 1984, 59-178013

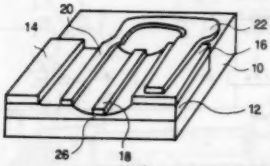
Int. Cl.[4] H01L *29/80*

U.S. Cl. 357—22 **10 Claims**

1. A Schottky-gate planar type field effect transistor comprising a semi-insulative semiconductor substrate, an active layer of impurity doped semiconductor material formed to cover at least a portion of one principal surface of the substrate, a source electrode and a drain electrode on a surface of the active layer in ohmic contact thereto and separated from each other, a first Schottky gate electrode on the same surface of the active layer between the source and drain electrodes and separated from the source and drain electrodes, and a second Schottky gate electrode on the same surface of the active layer between the drain electrode and the first gate electrode and separated from the drain electrode and the first gate electrode, a portion of the active layer underneath the second gate electrode having a sheet resistance smaller than that of an active

layer portion underneath the first gate electrode, and the source electrode and the second gate electrode being electri-





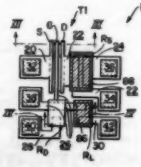
cally interconnected by a conductor located on the one principal surface side of the substrate.

4,709,252

INTEGRATED PHOTO-RESPONSIVE METAL OXIDE SEMICONDUCTOR CIRCUIT

Murzban D. Jhabvala, Seabrook; David R. Dargo, Arnold, and John C. Lyons, Columbia, all of Md., assignors to The United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 16, 1982, Ser. No. 399,074
Int. Cl.[4] H01L *27/14, 29/161, 29/78*
U.S. Cl. 357—30 **1 Claim**



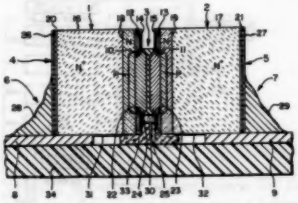
1. A photo-responsive device comprising:
a substrate (**50**) of semiconducting silicon containing impurities of a first type conductivity;
a source (S) region and a drain (D) region containing impurities of a second and opposite type conductivity extending inwardly from a surface (**51**) of said substrate and separated by a gate (G) region of said first type conductivity;
a layer (**58**) of silicon dioxide disposed upon said surface defining discrete openings (**60, 62**) separated by a strip of said silicon dioxide covering said surface at said gate region;
a plurality of electrical conductors (**20, 22, 24, 26, 28, 30**) disposed upon said silicon dioxide layer in a spaced configuration with a first of said electrical conductors making electrical contact with said source region via one of said openings, a second of said electrical conductors making electrical contact with said drain region via another of said openings, and a third of said electrical conductors transversing said strip of silicon dioxide;
a first island (R_D) of a lead chalcogenide material exhibiting a photo-responsivity to infrared radiation lying on said silicon dioxide layer in ohmic contact with said third electrical conductor and one of said other of said plurality of conductors;
a second island (R_L) of a lead chalcogenide material lying on said silicon dioxide layer in ohmic contact with said third electrical conductor and another of said other of said plurality of conductors; and
a layer (**86/88**) of a material opaque to said infrared radiation completely covering said second island.

4,709,253

SURFACE MOUNTABLE DIODE

Cecil K. Walters, Scottsdale, Ariz., assignor to AMP Incorporated, Harrisburg, Pa.

Filed May 2, 1986, Ser. No. 859,126
Int. Cl.[4] H01L *23/48*
U.S. Cl. 357—68 **26 Claims**



1. A surface mountable bipolar diode comprising:
a first semiconductor element which defines a first outer face and a first inner face and comprises means for forming a first p-n junction therebetween;
a second semiconductor element which defines a second outer face and a second inner face and comprises means for forming a second p-n junction
first means for electrically interconnecting and mechanically securing the first and second inner faces together between the outer faces to form an integrated unit which defines a base extending between the outer faces, wherein the first and second p-n junctions are oriented with reverse polarity;
first and second conductive surfaces mounted on the first and second outer faces such that the first and second p-n junctions are positioned between the first and second conductive surfaces and the conductive surfaces extend away from the base;
said conductive surfaces positioned for surface mounting to respective mounting surfaces extending alongside the base.

4,709,254

CARRIER ELEMENT FOR AN IC MODULE

Yahya Haghiri-Tehrani, and Joachim Hoppe, both of Munich, Fed. Rep. of Germany, assignors to GAO Gesellschaft fur Automation und Organisation mbH, Fed. Rep. of Germany

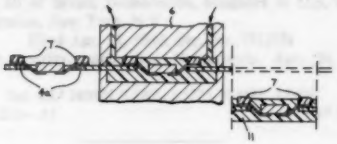
Continuation of Ser. No. 288,384, Jul. 31, 1981, abandoned. This application Sep. 10, 1984, Ser. No. 649,159
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1980, 3029667
Int. Cl.[4] H01L *21/283, 23/08, 23/12*
U.S. Cl. 357—72 **6 Claims**

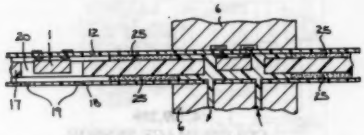
1. A carrier element for an IC-chip suitable for incorporation, as a unit, into a financial or identification card, said carrier element comprising:
a carrier stratum having an aperture with a plurality of contact surfaces surrounding the aperture for external communication to and from the carrier element;
electrically conductive leads connected to said contact sur-

faces and extending from said contact surfaces into said aperture of said carrier stratum;

an IC-chip positioned within said aperture and electrically connected to said contact surfaces of said carrier stratum by means of said electrically conductive leads; and

a cast, hardened body of resin completely surrounding the IC-chip, said resin lying on both sides of the portion of





said stratum adjacent said aperture and on the contact surfaces, said body of resin forming and defining the carrier element as a solid structure having flat surfaces parallel to said stratum and having a uniform thickness in a direction normal to said flat surfaces, said contact surfaces being so arranged in said resin body as to permit communication to and from said carrier element.

4,709,255

SEMICONDUCTOR DEVICE COMPRISING A NON-VOLATILE STORAGE TRANSISTOR

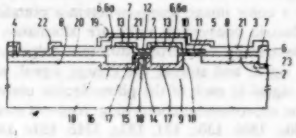
Cornelius D. Hartgring, and Johannes J. M. Joosten, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 672,026, Nov. 16, 1984, abandoned. This application Nov. 25, 1986, Ser. No. 934,884

Claims priority, application Netherlands, Jun. 27, 1984, 8402023

Int. Cl.⁴ H01L *29/94, 29/78, 21/76*

U.S. Cl. 357—23.5 **12 Claims**



1. A semiconductor device having a storage cell with a main current path and comprising a non-volatile storage transistor having a charge storage region which comprises an insulated conductive layer, and a control electrode capacitively coupled to the insulated conductive layer, charge stored in the charge storage region representing stored information and the storage transistor being included in the main current path of the storage cell, comprising a semiconductor body with a substrate region of a first conductivity type and having a semiconductor surface, a first and a second electrode region and a channel region of the storage transistor located at said semiconductor surface, which form part of the main current path, the semiconductor surface locally adjoining a first thick insulating layer which, viewed on the semiconductor surface, is bounded by a first edge, the first and the second electrode region each forming a rectifying junction with an adjoining portion of said substrate region of the first conductivity type, a second insulating layer, the channel region being separated by said second insulating layer from a first part of the insulated conductive layer, and a third thin insulating layer, an injector region of a second conductivity type opposite to the first conductivity type at the semiconductor surface which adjoins the common substrate region and which, viewed on the semiconductor surface, is entirely enclosed by the first thick insulating layer and is separated by said third thin insulating layer from a second part of the insulated conductive layer, the first and the second part of the insulated conductive layer being interconnected by a third part separated by the first thick insulating layer from the semiconductor surface, and a semiconductor zone of the second conductivity type covered by the first thick insulating layer and forming an electrical connection for the injector region which forms part of the second electrode region, the injector region being doped more weakly than the semiconductor zone and the semiconductor zone, viewed on the semiconductor surface, having a circumference of which at least a part follows the contour of the first edge of the first thick insulating layer, while the third part of the insulated conductive layer has at least half the area of the insulated conductive layer.

4,709,256

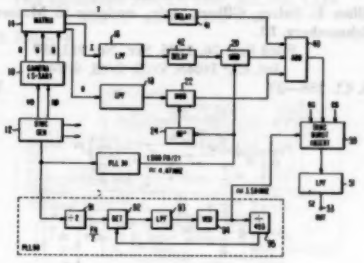
WIDE SCREEN COMPOSITE VIDEO SIGNAL ENCODER AND STANDARD ASPECT RATIO DECODER HAVING BARST AND SUBCARRIER COMPONENTS OF DIFFERENT FREQUENCIES

Bernard J. Lechner, and Kerns H. Powers, both of Princeton, N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Mar. 12, 1986, Ser. No. 838,755

Int. Cl.⁴ H04N *11/14*

U.S. Cl. 358—11 **2 Claims**



1. An encoder for producing a wide-screen composite video output signal, comprising:

first signal source means for providing a wide-screen video signal in component form including a luminance component, a first chrominance component and a second chrominance component, said components being representative of a wide-screen image having an aspect ratio greater than a standard aspect ratio and having line and field rates conforming to a given broadcast standard;

second signal source means for providing a color subcarrier signal having a selected frequency proportional to a standard color subcarrier frequency multiplied by said aspect ratio of said wide-screen image and divided by said standard aspect ratio, said selected frequency also being an odd multiple of one-half said line rate of said given broadcast standard;

modulator means responsive to said color subcarrier signal of said second signal source means for modulating said chrominance component signals on respective quadrature related carrier waves; and

output means for combining said luminance component and

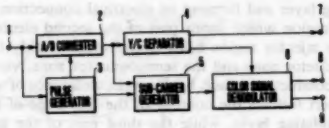
said modulated chrominance components and for inserting a color burst component having a frequency equal to said standard color subcarrier signal to form said wide-screen composite video output signal.

4,709,257

COLOR SIGNAL DEMODULATION APPARATUS

Norio Suzuki, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Jul. 31, 1986, Ser. No. 892,242
Claims priority, application Japan, Aug. 7, 1985, 60-172373
Int. Cl.[4] H04N 9/66
U.S. Cl. 358—23 6 Claims



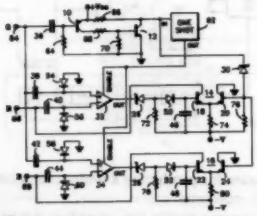
1. A color signal demodulation apparatus comprising: means for obtaining a sampled value of a carrier chrominance signal from a composite color television signal; means for obtaining a phase angle signal of a subcarrier at the same sampling time as that of the carrier chrominance signal; and means for obtaining a baseband color signal based on the sampled value of the carrier chrominance signal and the phase angle signal of the subcarrier.

4,709,258

CIRCUIT AND METHOD FOR ADDING GREEN SYNCHRONIZATION PULSE TO RED AND BLUE VIDEO SIGNALS

William E. Salzer, Gilbert, Ariz., assignor to Motorola Inc., Schaumberg, Ill.

Filed Sep. 26, 1986, Ser. No. 911,857
Int. Cl.[4] H04N 9/00, 9/68, 9/44
U.S. Cl. 358—27 5 Claims



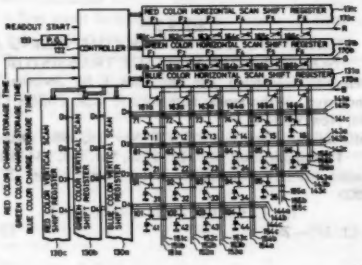
1. A synchronization pulse addition circuit comprising:
synchronization separator means, for coupling to a first video signal having a synchronization pulse portion thereof and for detecting said synchronization pulse portion of said first video signal;
one-shot means coupled to said synchronization separator means;
first comparator means, for coupling to said first video signal and to a second video signal and coupled to said one-shot means, for comparing the synchronization pulse portions of said first video signal and said second video signal;
second comparator means, for coupling to said first video signal and to a third video signal and coupled to said one-shot means, for comparing the synchronization pulse portions of said first video signal and said third video signal;
first amplifier means, coupled to said synchronization separator means and said first comparator means, for adding the synchronization pulse portion of said first video signal to said second video signal; and
second amplifier means, coupled to said synchronization separator means and said second comparator means, for adding the synchronization pulse portion of said first video signal to said third video signal.

4,709,259

COLOR IMAGE SENSOR

Kenji Suzuki, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 8, 1986, Ser. No. 860,791
Claims priority, application Japan, May 8, 1985, 60-96065; May 8, 1985, 60-96066
Int. Cl.[4] H04N 9/07, 9/077
U.S. Cl. 358—48 8 Claims


READOUT START
CONTROLLER
RED COLOR HORIZONTAL SCAN SHIFT REGISTER
GREEN COLOR HORIZONTAL SCAN SHIFT REGISTER
BLUE COLOR HORIZONTAL SCAN SHIFT REGISTER
RED COLOR CHARGE STORAGE TIME
GREEN COLOR CHARGE STORAGE TIME
BLUE COLOR CHARGE STORAGE TIME
RED COLOR VERTICAL SCAN SHIFT REGISTER
GREEN COLOR VERTICAL SCAN SHIFT REGISTER
BLUE COLOR VERTICAL SCAN SHIFT REGISTER

1. In a color image sensor wherein a plurality of types of photoelectric conversion units are alternately disposed for photoelectrically converting different colors of light into a charge signal and storing the charge signal, and the stored charge signal in each of the photoelectric conversion units is read; the improvement comprising: read-out means (**71**, **72**, **73**, **130**, **130***a*, **130***b*, **130***c*, **131**, **131***a*, **131***b*, **131***c*, **141**, **141***a*, **141***b*, **141***c*, **151**, **151***a*, **151***b*, **151***c*, **161***a*, **161***b*, **161***c*, **170***a*, **170***b* and **170***c*) for each of said types of said photoelectric conversion units for reading said charge signals in a color-separated state, said plurality of types of photoelectric conversion units including a red photodiode (**11**) for storing a charge signal obtained through photoelectric conversion of red light, a green photodiode (**12**) for storing a charge signal obtained through photoelectric conversion of green light, and a blue photodiode (**13**) for storing a charge signal obtained through photoelectric conversion of blue light, wherein said photodiodes are arranged in a matrix grouped in units each constructed of M rows and N columns, wherein M and N are integers equal to at least three, and said readout means for each color read out the charge signals such that the charge signals of the photodiodes of each unit are read out simultaneously for all photodiodes of the same color within an individual unit.

4,709,260

COLOR TELEVISION CAMERA WITH TEST IMAGE PROJECTOR AND PRECOMPENSATION MEANS FOR CORRECTING FOR IMAGING ERRORS CAUSED BY OBLIQUE ANGLES OF INCIDENCE OF TEST IMAGES ON PICKUP ELEMENTS

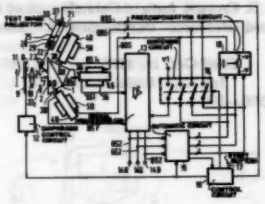
Wilhelmus H. M. Geerts; Filippus L. Stok, and Engbert Tienkamp, all of Breda, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 11, 1985, Ser. No. 721,971

Claims priority, application Netherlands, Apr. 24, 1984, 8401309

Int. Cl.[4] H04N 9/093, 5/225, 9/097, 17/02

U.S. Cl. 358—51 17 Claims



1. A color television camera comprising:

a plurality of pickup elements, each pickup element having a pickup area with an optical axis, each pickup element generating an electrical image signal corresponding to an optical image incident on its pickup area;

an optical color separation system for receiving light from a scene and for directing an image of the scene to each of the pickup areas, each scene image having an optical axis which corresponds to the optical axis of the pickup area to which the scene image is directed;

a test image projector for projecting a test image onto each of the pickup areas via the color separation system; and

an adjusting circuit for synchronizing the image signals generated by the pickup elements when the test images are projected onto the pickup areas;

characterized in that:

the test images are projected onto the pickup areas at oblique angles of incidence with respect to the optical axes of the corresponding scene images; and

the camera further comprises precompensation means for correcting for imaging errors caused by the oblique angles of incidence of the test images.

4,709,261

COLOR IMAGE DISPLAY SYSTEM FOR PRODUCING AND COMBINING TWO SIMILARLY-ORIENTED COLOR COMPONENT IMAGES AND AN INVERTED COLOR COMPONENT IMAGE

Gordon R. Spencer, Westwood, Mass., assignor to Raytheon Company, Lexington, Mass.

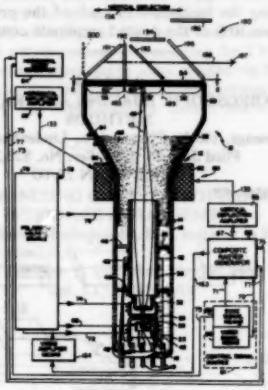
Filed Dec. 5, 1983, Ser. No. 557,981

Int. Cl.[4] H04N 9/22, 9/16, 9/31

U.S. Cl. 358—66 17 Claims

1. In combination:

image producing means including an output phosphor screen, said image producing means producing on said screen a pair of mutually inverted images of a subject and an additional image of said subject, said additional image being disposed between said mutually inverted images and being oriented similarly to one of said mutually inverted images; and



output optical means coupled to said output phosphor screen for combining said mutually inverted images and said additional image.

4,709,262

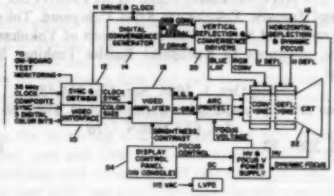
COLOR MONITOR WITH IMPROVED COLOR ACCURACY AND CURRENT SENSOR

Robert H. Spieth, Ronkonkoma, and Anthony N. DeLorenzo, Ft. Salonga, both of N.Y., assignors to Hazeltine Corporation, Greenlawn, N.Y.

Continuation of Ser. No. 722,959, Apr. 12, 1985, abandoned. This application Jan. 27, 1987, Ser. No. 7,316

Int. Cl.[4] H04N 9/73, 5/68

U.S. Cl. 358—74 19 Claims



1. A color video monitor having a video siganl path for providing an input video signal and for displaying the video signal on a high resolution CRT display, comprising:

means for processing an input video signal, said means for processing associated with the video signal path such that the video signal is not affected by said means for processing;

means for producing color convergence signals;

first means, connected to receive said color convergence signals, for providing vertical deflection signals and convergence driver signals for said color video monitor;

second means, connected to the first means, for providing horizontal deflection signals and dynamic focus signals for said color video monitor; and

third means, coupled to said cathode ray tube, for receiving said color convergence, vertical and horizontal deflection signals and for controlling the display on said cathode ray tube;

wherein said means for processing an input video signal comprises: (1) digital-to-analog means for converting a three bit digital color code input to a signal representative

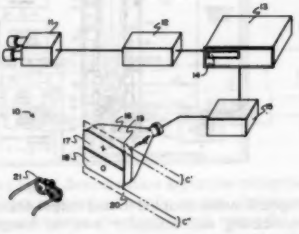
of a desired amplitude component for a primary color and (2) a plurality of separate feedback loops, one loop for each of the primary colors, said feedback loops for maintaining the brightness of each of the primary colors to within 10% of the desired amplitude component.

4,709,263

STEREOSCOPIC IMAGING APPARATUS AND METHODS

John Brumage, 185 N. Clinton Ave., Lindenhurst, N.Y. 11757

Filed Jan. 28, 1986, Ser. No. 823,263
Int. Cl.[4] H04N *13/00*
U.S. Cl. 358—88 **26 Claims**



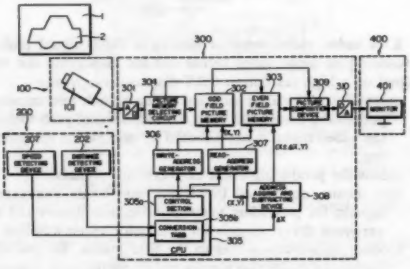
1. An stereoscopic imaging process comprising receiving stereo images, modifying said stereo images for any scope aspect ratio, recording said modified stereo images on a visual media with chromatic aberration, transmitting said modified stereo image pairs to a image viewing device and independently viewing said stereo images through viewing means having chromatic aberration complementary to the chromatic aberration misregistration recorded on said visual media so that the left and right eyes view said images with depth.

4,709,264

PICTURE PROCESSING APPARATUS

Masafumi Tamura, Yokohama; Arisa Uchiyama, Tokyo; Takashi Kondo, and Satoshi Kageyama, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 1, 1986, Ser. No. 914,453
Claims priority, application Japan, Oct. 2, 1985, 60-217966
Int. Cl.[4] H06N *7/18*
U.S. Cl. 358—93 **18 Claims**



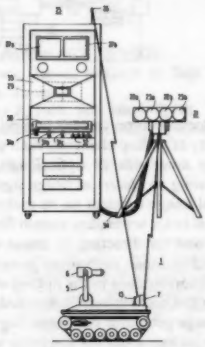
1. A picture processing apparatus, comprises:
image pickup means for taking a picture of an object and outputting picture information in the interlace system;
picture information storage means for storing first field picture information and second field picture information outputted from said image pickup means;
speed detecting means for detecting a moving speed of the object picked up by the image pickup means;
read-address correction means for relatively correcting the addresses for reading the first and second field picture information stored in said picture information storage means in accordance with the moving speed of the object detected by said speed detecting means; and
picture composition means for performing the composition of the first field picture information and the second field picture information outputted from said picture information storage means after the address correction.

4,709,265

REMOTE CONTROL MOBILE SURVEILLANCE SYSTEM

Eugene B. Silverman, Ellicott City; Richard K. Simmons, and Robert B. Croston, both of Columbia, all of Md., assignors to Advanced Resource Development Corporation, Columbia, Md.

Filed Oct. 15, 1985, Ser. No. 787,338
Int. Cl.[4] H04N *7/10, 13/00, 5/30*
U.S. Cl. 358—108 **14 Claims**



1. A remote control mobile surveillance system comprising:
an operator control center, said center comprising manual command operation and transmission means, telemetry receive and reporting means and antenna means;
a surveillance vehicle located remote from said control center and in wireless communication therewith, said vehicle comprising:
chassis means, said chassis means being sized and shaped to fit within standard doorways and stairways and to provide an optimally low center of gravity for said vehicle;
propulsion means adapted to provide movement to said vehicle and being mounted on said chassis means and comprising at least two independently controllable motor and track means;
cover means removably mounted on said chassis means and adapted to support a plurality of payloads;
payload means adapted to be movable in at least one direction and to have mounted thereon an operative load means, said payload means being removably mounted on said cover means;
telecommunications means adapted to receive commands from and transmit telemetry to said operator control center, said means being operatively connected to said propulsion means and said payload means, whereby an operator at said operator control center can remotely control and monitor the movement of said vehicle and the operation of said payload means;
said cover means being substantially rectangular in shape, having a vehicle front, a vehicle rear and two longitudinal side edges, a centrally located planar portion on which is mounted said payload means and a front planar apron

portion extending from said payload at an angle downward to said vehicle front edge; and

said payload means being adapted to move said operative load forward and below said centrally located planar position, along said planar apron position of said cover means, whereby the center of gravity of said vehicle may be moved lower and forward dynamically during movement of said vehicle up an inclined surface under remote control from said operator control center.

4,709,266

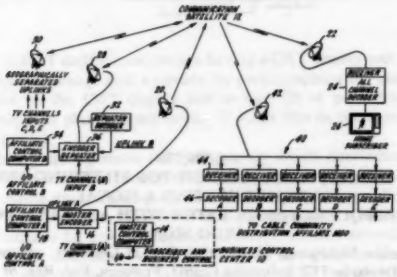
SATELLITE SCRAMBLING COMMUNICATION NETWORK USING GEOGRAPHICALLY SEPARATED UPLINKS

Orest J. Hanas, Palatine; Frank C. Pennypacker, Crystal Lake, both of Ill.; Charles B. Radloff, and Richard D. Schulman, both of San Diego, Calif., assignors to Oak Industries Inc., Rancho Bernardo, Calif.

Filed Jan. 14, 1985, Ser. No. 691,513

Int. Cl.[4] H04N 7/167

U.S. Cl. 380—20 **6 Claims**



1. A satellite scrambling communications network using geographically separated uplinks to provide scrambled video and audio signals and descrambling control data to separated individual subscribers and to separated TV signal distribution systems, including:

(a) a business control center providing a master data stream including individual subscriber address and encryption data and uplink channel allocation control data, and including means for communicating said master data stream to a first satellite communication uplink,

(b) a first satellite communication uplink for transmitting one or more TV communication channels, as controlled by the allocation data in the master data stream, to a communication satellite, means at said first uplink for adding to the master data stream, supplementary data, peculiar to those TV signal distribution systems which will distribute the one or more TV communication channels from said first uplink, and means at said first uplink for transmitting the master data stream and supplementary first uplink data stream to the communication satellite,

(c) a plurality of geographically separated additional satellite communication uplinks, each including means for receiving the master data stream as transmitting from the first uplink via the communication satellite, means at each additional uplink for transmitting one or more TV communication channels, as controlled by the allocation data in the master data stream, to the communication satellite, means at each additional uplink for adding to the master data stream, supplementary data peculiar to those TV distribution systems which will distribute the one or more TV communication channels from each additional uplink, and means at each additional uplink for transmitting the supplementary data peculiar thereto to the communication satellite,

(d) multiple individual subscriber receiver decoders, each having antenna means for receiving the TV communication channels as transmitted by the uplinks via the communication satellite, each subscriber receiver decoder being controlled by the master data stream,

(e) a plurality of separated TV signal distribution systems, each with antenna means for receiving the TV communication channels from one or more uplinks via the communication satellite, each TV distribution system being controlled by the supplementary data streams from said uplinks.

4,709,267

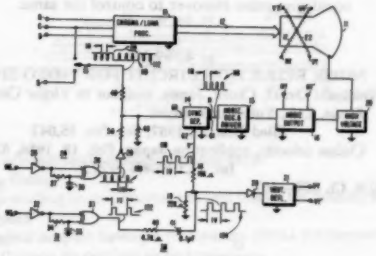
SYNCHRONIZING CIRCUIT WITH IMPROVED INTERLACE ARRANGEMENT

Gene K. Sendelweck, Indianapolis, Ind., assignor to RCA Corporation, Princeton, N.J.

Filed Nov. 7, 1985, Ser. No. 796,046

Int. Cl.[4] H04N 5/04

U.S. Cl. 358—148 **4 Claims**



1. A synchronizing circuit for a video apparatus comprising:

means for receiving first synchronizing signals having line rate and field rate synchronizing signal components;

means for receiving second synchronizing signals having separate line rate and field rate synchronizing signals;

means coupled to said means for receiving said first synchronizing signals and to said means for receiving said second synchronizing signals for processing said first synchronizing signals and said separate line rate synchronizing signals to develop a first line rate synchronizing signal for synchronizing the operation of said video apparatus and a first field rate synchronizing signal;

means for receiving said separate field rate synchronizing signal and said first field rate synchronizing signal and providing said separate field rate synchronizing signal or said first field rate synchronizing signal for synchronizing the operation of said video apparatus, said separate field rate synchronizing signal being provided over said first field rate synchronizing signal when both said first and said separate field rate synchronizing signals are present.

4,709,268

AUTOMATIC FREQUENCY PULLING CIRCUIT

Taizo Akimoto, Minamiashigara, and Masahiko Kawai, Tokyo, both of Japan, assignors to Fuji Photo Film Co., Ltd. and Ikegami Tsushinki Co., Ltd., both of, Japan

Filed Jul. 29, 1986, Ser. No. 890,230

Claims priority, application Japan, Jul. 29, 1985, 60-167292; Jul. 29, 1985, 60-167293

Int. Cl.[4] H04N 5/06

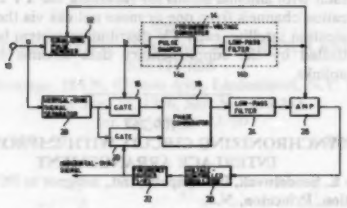
U.S. Cl. 358—150 **6 Claims**

1. An automatic frequency pulling circuit comprising;

an equalizing pulse remover responsive to a synchronizing signal separated from a composite video signal for alternately removing equalizing pulses therefrom to produce a horizontal synchronizing signal;

a PLL circuit composed of at least a phase comparator and

a voltage-controlled oscillator, said phase comparator being arranged to compare the phases of an output from said equalizing pulse remover and an output from said voltage-controlled oscillator; and



a frequency-to-voltage converter for converting the frequency of the output from said equalizing pulse remover to a voltage, which is applied as a control signal to said equalizing pulse remover to control the same.

4,709,269

NOISE REDUCTION CIRCUIT FOR VIDEO SIGNAL

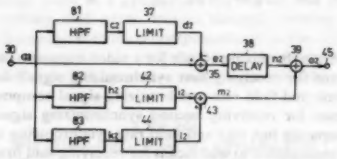
Hidetoshi Ozaki, Chofu, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Feb. 17, 1987, Ser. No. 15,042

Claims priority, application Japan, Feb. 18, 1986, 61-33625

Int. Cl.[4] H04N *5/213*

U.S. Cl. 358—167 **10 Claims**



1. A noise reduction circuit for video signal comprising:

first circuit means supplied with an input video signal including a noise component, said first circuit means comprising a first filter circuit for obtaining from said input video signal a high frequency component including the noise component and a first limiter for limiting large amplitude parts of an output signal of the first filter circuit, said first filter circuit having a first impulse response characteristic;

second circuit means supplied with said input video signal, said second circuit means comprising a second filter circuit for obtaining from said input video signal a high frequency component including the noise component and a second limiter for limiting large amplitude parts of an output signal of the second filter circuit, said second filter circuit having a second impulse response characteristic wherein an amplitude increases or decays with time, said second impulse response characteristic being complementary to said first impulse response characteristic;

third circuit means supplied with said input video signal, said third circuit means comprising a third filter circuit for obtaining from said input video signal a high frequency component including the noise component and a third limiter for limiting large amplitude parts of an output signal of the third filter circuit, said third filter circuit having a third impulse response characteristic wherein an amplitude increases with time and thereafter decays with time, said third impulse response characteristic being essentially a combination of said first and second impulse response characteristics, said first through third limiters having identical threshold levels; and

fourth circuit means supplied with said input video signal and output signals of said first through third circuit means for carrying out a subtraction between said input video signal and the output signal of said first circuit means so as to obtain a first signal which is substantially eliminated of the noise component except for a noise component and distortion remaining at parts in vicinities of rises and falls in the video signal caused by said first limiter, carrying out a subtraction between the output signals of the second and third circuit means so as to obtain a second signal which includes the noise component and the waveform distortion of said first signal with an inverted phase, and for adding said first and second signals so as to produce an output video signal which has been substantially eliminated of all the noise component.

4,709,270

CIRCUIT ARRANGEMENT FOR FILTERING AND DEMODULATING A SIGNAL FREQUENCY-MODULATOR WITH AT LEAST ONE AUDIO SIGNAL

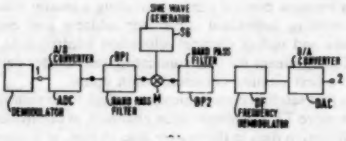
Soenke Mehrgardt, March, Fed. Rep. of Germany, assignor to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany

Filed Jun. 2, 1986, Ser. No. 869,237

Claims priority, application European Pat. Off., Jun. 1, 1985, 85106767.8

Int. Cl.[4] H04N *5/44, 5/60*

U.S. Cl. 358—188 **3 Claims**



1. A circuit arrangement for filtering and demodulating a television signal which is frequency modulated with at least one audio signal, said circuit arrangement comprising:

a demodulator;

an analog-to-digital converter for converting a video signal from analog to digital form, said analog to digital converter having its input coupled to said demodulator;

a mixer stage comprising a multiplier having a first input coupled to a digital sine-wave generator, having a second input and having an output;

a first digital bandpass filter stage coupling the output of said analog-to-digital converter to said multiplier second input;

a frequency demodulator stage having an input and an output;

a second digital band-pass filter stage containing at least one decimation stage and coupling said multiplier output to said frequency demodulator stage input; and

a digital-to-analog converter coupled to the output of said frequency demodulator stage and having an output for providing said at least one audio signal.

4,709,271

CRT MULTIFORMAT CAMERA

Keiki Yamaguchi, and Shozo Tomita, both of Tokyo, Japan, assignors to Yokogawa Medical Systems, Limited, Tokyo, Japan

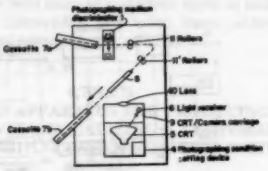
PCT No. PCT/JP85/00517, § 371 Date Apr. 30, 1986, § 102(e) Date Apr. 30, 1986, PCT Pub. No. WO86/01912, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 14, 1985, Ser. No. 865,192

Claims priority, application Japan, Sep. 17, 1984, 59-194246

Int. Cl.[4] H04N *5/84*

U.S. Cl. 358—244 5 Claims



1. A CRT multiformat camera having a CRT display unit for showing an image and, a camera for photographing the image shown on the CRT display unit at two (2) or more frame positions on photographic media of either film or photoprint, comprising;

photographing media discriminator (1) which discriminates between photographic media and outputs a photographic media discriminating signal, and photographing condition setting device (4) which sets photographic conditions suitable for a photographic media type selected according to the discriminating signal given by said photographing media discriminator to the camera and/or the CRT display unit.

4,709,272

IMPLOSION PROTECTION FOR VIDEO REPRODUCING DEVICE

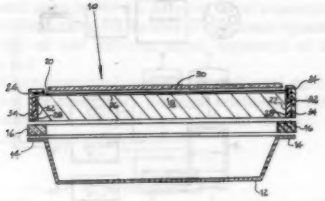
Kurt-Manfred Tischer, Wendlingen, Fed. Rep. of Germany, assignor to Standard Elektrik Lorenz, Stuttgart, Fed. Rep. of Germany

Filed Jun. 13, 1986, Ser. No. 873,901

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1985, 3521315

Int. Cl.[4] H04M *5/65*

U.S. Cl. 358—247 16 Claims



1. An implosion system for a flat video reproducing device comprising, in combination:

a shallow envelope, said shallow envelope having a rim portion;

a flat glass screen for reproducing a video image, said flat glass screen having an external surface, an internal surface, and a plurality of side surfaces, said internal surface being supported adjacent to said side surfaces by said rim portion of said envelope, said flat glass screen and said envelope defining an interior space for containing a vacuum;

a mounting frame surrounding said side surfaces of said flat glass screen and separated therefrom by a sealing space; and

a sealing compound resident within said sealing space for dampening vibrations of the flat video reproducing device upon loss of said vacuum from said interior.

4,709,273

ORIGINAL READING DEVICE

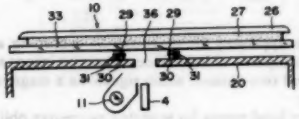
Haruhisa Honda, Yokohama, and Takashi Saito, Ichikawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 19, 1985, Ser. No. 810,740

Claims priority, application Japan, Dec. 28, 1984, 59-199301[U]

Int. Cl.[4] H04N *1/04*

U.S. Cl. 358—256 38 Claims



1. An original reading device, comprising:

a main frame;

optical reading means, disposed in said frame, for reading an original;

an original support having a transparent platen for supporting thereon an original to be read;

driving means for moving said original support;

a limiting member disposed between said platen and said frame, said limiting member being spaced from said platen by a predetermined amount to contact said platen when said platen deforms beyond a predetermined amount, so as to prevent further deformation of said platen.

4,709,274

IMAGE PROCESSING APPARATUS

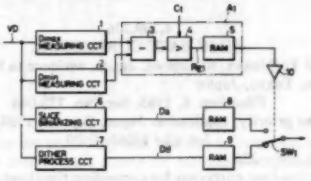
Hiroshi Tanioka, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 27, 1984, Ser. No. 644,558

Claims priority, application Japan, Aug. 29, 1983, 58-156412; Sep. 1, 1983, 58-159077; Sep. 1, 1983, 58-159078; Sep. 19, 1983, 58-171081; Sep. 22, 1983, 58-174376

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—283 37 Claims



1. An image processing apparatus comprising:

first processing means for performing a halftone process of input image data;

second processing means for performing a non-halftone process of the input image data; and

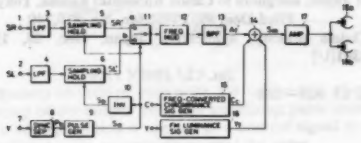
means for combining image data produced from said first and second processing means, wherein said combining means has means for ORing and means for ANDing image data from said first and second processing means.

4,709,275

APPARATUS FOR MAGNETICALLY RECORDING AND/OR REPRODUCING TWO-CHANNEL AUDIO SIGNALS TOGETHER WITH A COLOR VIDEO SIGNAL IN SUCCESSIVE OBLIQUE TRACKS ON A MAGNETIC TAPE

Tokuya Fukuda, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Mar. 7, 1985, Ser. No. 709,123
Claims priority, application Japan, Mar. 24, 1984, 59-56456
Int. Cl.[4] H04N *5/782*
U.S. Cl. 358—310 **7 Claims**



1. An apparatus for magnetically recording a color video signal composed of luminance and chrominance signal components and two-channel audio signals on a magnetic tape, comprising:

rotary head means for scanning successive oblique tracks on the magnetic tape;

means for frequency-modulating a carrier by said luminance signal component to provide a frequency-modulated luminance signal;

means for frequency-converting said chrominance signal component to provide a frequency-converted chrominance signal in a frequency band lower than the frequency band of said frequency-modulated luminance signal;

audio signal processing means receiving said two-channel audio signals and alternately frequency-modulating an audio carrier therewith to provide a frequency-modulated audio signal consisting essentially of first and second time-multiplexed segments of predetermined duration corresponding to said audio carrier frequency-modulated by said two-channel audio signals, respectively, and havin a frequency band located substantially between the frequency bands of said frequency-modulated luminance signal and said frequency-converted chrominance signal, respectively;

signal mixing means for mixing said frequency-modulated audio signal with said frequency-modulated luminance signal and said frequency-converted chrominance signal to provide a mixed signal; and

means for applying said mixed signal to said rotary head means for recording in the successively scanned oblique tracks.

4,709,276

TIME BASE CORRECTOR

Tadaaki Yoshinaka, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Sep. 6, 1985, Ser. No. 773,046
Claims priority, application Japan, Sep. 12, 1984, 59-191381
Int. Cl.[4] H04N *9/89*
U.S. Cl. 358—326 **7 Claims**

1. A time base corrector for correcting time base fluctuations in a reproduced video signal VI recorded on a recording medium in such a format that at least two timeplexed video component signals R-Y and B-Y are recorded in one horizontal period segment 1H, which includes:

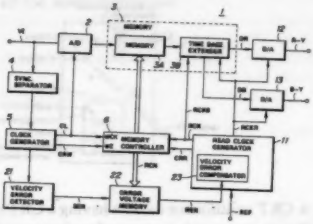
a clock generator for generating a write clock signal CL having time base fluctuations included in the reproduced video signal;

a memory unit for storing the reproduced video signal VI in response to the write clock signal CL;

a velocity error detector for detecting velocity error included in the reproduced video signal and outputting a velocity error signal RER corresponding thereto; and

a read clock generator including a velocity error compensator for generating read clock signals RCK phase-modulated in dependence upon the velocity error signal RER to read the stored reproduced video signal from said memory unit while correcting the time base fluctuations and velocity error, characterized in that said velocity error compensator comprises:

means for generating a first integral velocity error signal V1 for a first timeplexed video component signal signal RY in response to the velocity error signal RER;



means for generating a second integral velocity error signal V3 including an initial offset value V2 relative to the first integral velocity error signal V1 for a second timeplexed video component signal B-Y in response to the velocity error signal RER; and

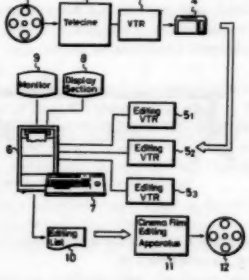
means for phase-modulating a reference clock signal having a frequency substantially the same as that of the write clock signal CL with the first and second integral velocity error signals V1 and V3 to generate at least two read clock signals RCKR and RCKB for sequentially and separately reading the at least two timeplexed video component signals.

4,709,277

EDITING DATA CONVERTING APPARATUS

Ichiro Ninomiya; Soujiro Kizu, and Hidehiko Sashoh, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 27, 1985, Ser. No. 716,648
Claims priority, application Japan, Mar. 28, 1984, 59-60321
Int. Cl.[4] H04N *5/782*; G11B *27/02*
U.S. Cl. 360—14.3 **4 Claims**



1. Editing data producing apparatus for producing first editing data for editing a cinema film based on second editing data obtained by editing a video signal reproduced from a record medium on which a cinema signal is recorded in a manner of said video signal, said video signal being obtained

from said cinema signal by an m : n ratio pull-down conversion, wherein m and n are both integers; said apparatus comprising:

means for supplying an editing video frame address representative of an editing location of said video signal;

means for supplying a reference video frame address representative of a predetermined cinema frame address of said cinema signal;

means for producing a relative address between said editing video frame address and said reference video frame address;

means for dividing a number representative of said relative address by a number which depends upon said m and n, so that a remainder is detected; and

means responsive to said remainder and to field data representative of a field status of said video signal at said editing location for converting said video frame address to a corresponding cinema frame address.

4,709,278

METHOD AND APPARATUS FOR PRODUCING AND SELECTIVELY EQUALIZING A TEMPORAL RELATIONSHIP BETWEEN SERIES OF DIGITAL SIGNALS

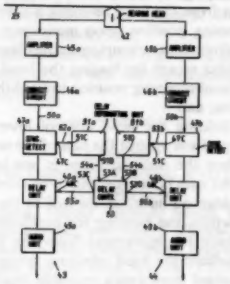
Roger Lagadec, Rümlang, Switzerland, assignor to Willi Studer AG, Regensdorf, Switzerland

Filed Sep. 9, 1985, Ser. No. 774,006

Claims priority, application Switzerland, Sep. 21, 1984, 04 526/84

Int. Cl.⁴ G17B *20/20, 5/02*

U.S. Cl. 360—26 **13 Claims**



1. A method of producing and selectively equalizing a temporal relationship between different signal sequences of digital signals, said method comprising the steps of:

generating a predetermined number of additional signals predicated upon one of the different signal sequences; and

adding said predetermined number of additional signals to an other one of said different signal sequences of digital signals; and

using said predetermined number of additional signals for indicating the momentary temporal relationship between two predetermined digital signals of said different signal sequences of digital signals.

4,709,279

READ/WRITE AMPLIFIER POWER CONTROL DEVICE FOR A DISK APPARATUS

Masaki Sano, Fuji, and Koji Osafune, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 3, 1985, Ser. No. 771,897

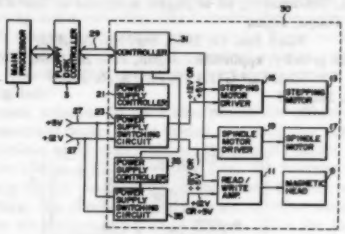
Claims priority, application Japan, Sep. 4, 1984, 59-183862

Int. Cl.⁴ G11B *21/08, 19/02*

U.S. Cl. 360—78 **6 Claims**

1. A power control device for a disk apparatus having a magnetic head for supplying a read signal and receiving a write signal and a read-write amplifier adapted to receive power from an external power supply for amplifying the read signal supplied from the magnetic head and the write signal supplied to the magnetic head in response to a power supply control signal generated by a power supply control signal generating means in response to a signal to start rotation of a spindle motor and a signal from the start of a seek operation to the completion of a seek operation to the completion of a seek operation generated by a main processor upon execution of a seek instruction for causing the disk apparatus to perform a seek operation on a disk, comprising:

a rotatable spindle motor adapted to rotate a magnetic recording disk;



a stepping motor for causing the magnetic head to move during a seek operation;

first power supply switching control means for selectively controlling the supply of power from a power source to said spindle motor and said stepping motor;

second power supply switching control means for prohibiting power from being supplied to the read/write amplifier from the external power supply for a preselected period of time after the start of rotation of said spindle motor and between the start of the seek operation and the completion of the seek operation in response to said power supply control signal.

4,709,280

APPARATUS FOR VARYING THE PATH OF MAGNETIC TAPE PASSING OVER A ROTARY TAPE HEAD

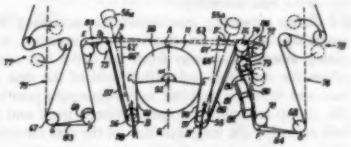
Jean Michel Delacou, Rueil-Malmaison, France, assignor to Enertec, Montrouge, France

Filed Oct. 2, 1985, Ser. No. 782,801

Claims priority, application France, Oct. 8, 1984, 84 15407

Int. Cl.⁴ G11B *5/584, 15/20, 15/61*

U.S. Cl. 360—85 **13 Claims**



1. Apparatus for recording and reading information of the type having a rotary head, means for moving a magnetic tape along a helical path over the rotary head, the head comprised of a drum on the periphery and in a secant plane of which at least one record and read head moves circularly, and means for maintaining the speed of rotation of the head during normal operation at a speed substantially higher than the speed of movement of the tape, the improvement comprising: two rollers disposed respectively upstream and downstream of the drum, and means for modifying the pitch of the helical path of the tape in dependence on the speed of the tape wherein at least one of said rollers is movable, and wherein said rollers are

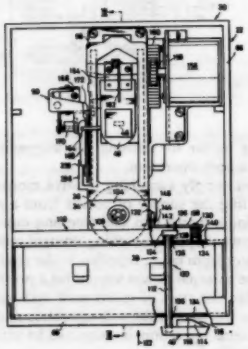
separated by a difference in height which is substantially constant and which is not zero, said means for modifying including means for moving each movable roller along a deflection path wherein the length of the tape portion lying between these rollers and passing over the drum and therefore the pitch of the helical path of the tape over the drum is varied without substantial variation of said difference in height between the rollers.

4,709,281

DATA TRANSFER APPARATUS FOR USE WITH A MAGNETIC DISK CARTRIDGE

Kazuhiko Inoue, Tokyo; Tsutomu Kawasaki, Iruma, and Toshio Ihana, Tokorozawa, all of Japan, assignors to Teac Corporation, Tokyo, Japan

Filed Jun. 19, 1985, Ser. No. 746,373
Claims priority, application Japan, Jun. 28, 1984, 59-133547
Int. Cl.[4] G11B *19/04, 19/10, 25/04*
U.S. Cl. 360—97 **5 Claims**



1. A data transfer apparatus for use with a magnetic disk cartridge having a magnetic disk rotatably enclosed in an apertured, protective envelope, the apparatus comprising:

(a) a housing having an entrance opening for the insertion and withdrawal of the disk cartridge to and from a predetermined data transfer position therein;

(b) a drive hub assembly rotatably mounted within the housing in a concentric relation with the magnetic disk of the disk cartridge when the latter is in the data transfer position;

(c) a clamp assembly disposed on the opposite side of the disk cartridge in the data transfer position with respect to the drive hub assembly;

(d) a clamp actuating mechanism for actuating the clamp assembly between an unclamping position, where the clamp assembly is away from the drive hub assembly to allow the insertion and withdrawal of the disk cartridge into and from the housing, and a clamping position where the clamp assembly engages between itself and the drive hub assembly the magnetic disk of the disk cartridge in the data transfer position, the clamp assembly when the clamping position being rotatable jointly with the magnetic disk and the drive hub assembly about a common axis;

(e) a first transducer head arranged on one side of the magnetic disk of the disk cartridge in the data transfer position;

(f) a carriage having the first transducer head mounted thereon for transporting same radially of the magnetic disk of the disk cartridge in the data transfer position;

(g) a second transducer head arranged on the opposite side of the disk cartridge in the data transfer position with respect to the first transducer head;

(h) a head arm having the second transducer head mounted thereon and itself pivotally mounted on the carriage for movement between a retracted position, where the second transducer head is away from the disk cartridge in the data transducer position, and a working position where the second transducer head urges the magnetic disk of the disk cartridge against the first transfer head for the establishment of data transfer contact of the magnetic disk with both first and second transducer heads;

(i) resilient means for biasing the head arm from the retracted toward the working position;

(j) a head control mechanism for holding the head arm in the retracted position against the bias of the resilient means when the disk cartridge is not inserted in the housing, even if the clamp assembly is then actuated inadvertently from the unclamping to the clamping position by the clamp actuating mechanism, and for allowing the head arm to pivot on the carriage from the retracted to the working position under the bias of the resilient means in response to the actuation of the clamp assembly from the unclamping to the clamping position by the clamp actuating mechanism following the insertion of the disk cartridge in the housing toward the data transfer position, wherein the head control mechanism comprises:

a head control lever operatively engaged with the head arm and movable between a head retaining position for retaining the head arm in the retracted position against the bias of the resilient means and a head releasing position for allowing the head arm to pivot under the retracted to the working position under the bias of the resilient means, the head control lever being held in the head retaining position when the clamp assembly is in the unclamping position, and being conditioned for movement from the head retaining position toward the head releasing position upon movement of the clamp assembly from the unclamping to the clamping position;

second resilient means for biasing the head control lever from the head retaining position toward the head releasing position; and

a cam for holding the head control lever in the head retaining position against the bias of the second resilient means when the disk cartridge is not inserted in the housing, the cam being adapted to be acted upon by the disk cartridge on insertion thereof to the data transfer position within the housing for conditioning the head control lever for movement from the head retaining position toward the head releasing position;

the head control lever being movable from the head retaining position to the head releasing position under the bias of the second resilient means only when the disk cartridge is inserted to the head transfer position and the clamp assembly actuated to the clamping position; and

(k) a lever support having a pair of confronting walls and fixedly mounted within the housing for pivotally supporting the head control lever, the head control lever comprising a base portion capable of elastic deformation, and a pair of trunnions extending from the base portion and rotatably received in a pair of holes defined one in each of the confronting walls of the lever support.

4,709,282

DEVICE FOR LOADING OR UNLOADING MAGNETIC DISC PACK

Kazukiyo Tamada, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Japan

Filed Apr. 8, 1986, Ser. No. 849,277
Claims priority, application Japan, Apr. 12, 1985, 60-078094
Int. Cl.[4] G11B *5/012, 17/03*
U.S. Cl. 360—97 **9 Claims**

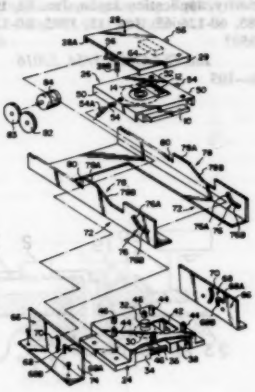
1. A device for loading or unloading a magnetic disc pack housing a magnetic disk into and out of a recorder/reproducer, said device comprising:

a holder adapted to receive said magnetic disc pack, said holder being further adapted for translation so as to guide

a center core of said magnetic disc to a position where said center core is coupled to a rotary drive shaft;

a regulating plate;

a regulating plate holder for guiding said regulating plate to a position opposed to a magnetic recording/reproducing head;



a recorder/reproducer case, said case encasing said holder and said regulating plate holder and including an insertion opening through which said magnetic disc pack may be inserted into said holder; and

a blocking plate formed on said regulating plate holder, said blocking plate closing said insertion opening during recording/reproducing.

4,709,283

RECORDING DISK CENTERING AND CLAMPING APPARATUS

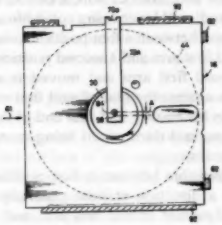
Toshihiro Kitahara, Tokyo; Yoshiaki Sakai; Kou Kobayashi, both of Higashikurume, and Satoru Kikuchi, Mitaka, all of Japan, assignors to Teac Corporation, Tokyo, Japan

Filed Sep. 10, 1985, Ser. No. 774,336

Claims priority, application Japan, Sep. 20, 1984, 59-142547

Int. Cl.[4] G11B *5/016, 17/04*

U.S. Cl. 360—99 **4 Claims**



1. In an apparatus for data transfer with a recording disk cartridge having a flexible recording disk housed for rotation within a protective envelope, said envelope and recording disk having substantially concentric geometrical centers, the disk being displaceable within the envelope in a plane of rotation, the envelope having formed therein a central opening larger than a central opening in the recording disk to expose an eccentric annular portion thereof when said disk is displaced within said envelope, in combination:

(a) frame means including an entrance slot for loading the recording disk cartridge;

(b) drive means on the frame means including a drive hub rotatable about a predetermined axis, the drive hub having a socket defined coaxially therein with an annular disk bearing surface formed concentrically around the socket;

(c) a clamp carrier pivotable about a predetermined fulcrum on the frame means and in a plane normal to a plane containing the disk bearing surface of the drive hub;

(d) a clamp rotatably mounted to the clamp carrier for joint movement therewith into and out of engagement with the drive hub, the clamp including a collet tapered toward a leading end thereof directed toward the drive hub for engagement in the socket in the drive hub through central opening in the recording disk to center the recording disk with respect to the drive means, and a flange on the tapered collet for clamping the exposed annular portion of the recording disk against the disk bearing surface of the drive hub;

(e) means, attached to the frame means, for offsetting the geometrical center of the loaded recording disk cartridge a predetermined distance from the axis of rotation of the drive hub in a direction away from the fulcrum of the clamp carrier along the plane containing the disk bearing surface, the predetermined distance of offset being less than the difference L1—L2, wherein L1 is the distance between the point of intersection of the locus of that point on an annular edge around the leading end of the collet which is nearest to the fulcrum of the clamp carrier with the plane containing the disk bearing surface of the drive hub and that point on an annular edge of the drive hub bounding the entrance end of the socket which is nearest to the fulcrum of the clamp carrier, and where L2 is the distance between the point of intersection of the locus of that point on the annular edge around the leading end of the collet which is farthest away from the fulcrum of the clamp carrier with the plane containing the disk bearing surface of the drive hub and that point on the annular edge of the drive hub bounding the entrance end of the socket which is farthest away from the fulcrum of the clamp carrier.

4,709,284

MAGNETIC RECORDING DEVICE HAVING A STABILIZED ZIRCONIA SLIDER AND A COBALT BASED RECORDING MEDIUM

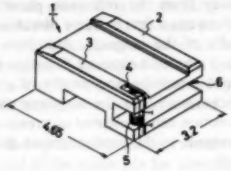
Juro Endo; Shiro Murakami; Yukiharu Takada, and Yoshiharu Koike, all of Saitama, Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Sep. 19, 1985, Ser. No. 777,508

Claims priority, application Japan, Sep. 20, 1984, 59-197208

Int. Cl.[4] G11B *5/66, 5/60, 17/32*

U.S. Cl. 360—103 **14 Claims**



1. A magnetic recording device comprising a magnetic disk having a magnetic recording layer formed on a substrate, and a magnetic head having a slider portion and a magnetic core attached to said slider portion, said slider portion being alternately brought into contact with and separated from the surface of said magnetic disk, said magnetic recording layer of said magnetic disk being made of a Co-based alloy and said slider portion of said magnetic head consisting essentially of

zirconia and 5-20 mol percent of a stabilizer so that said zirconia has a stabilized main phase having cubic crystal grains at a temperature below about 1200° C.

4,709,285

HEAD ASSEMBLIES MOUNTED FOR OPTIMUM CONTACT WITH A FLEXIBLE MAGNETIC DISK

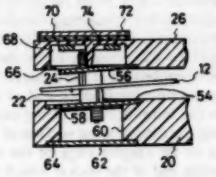
Katsuya Enami, Tachikawa; Sinobu Kawamura, Tokyo; Fumio Nagase, Tama, and Shinichi Aikawa, Mitaka, all of Japan, assignors to Teac Corporation, Tokyo, Japan

Filed Sep. 10, 1985, Ser. No. 774,337

Claims priority, application Japan, Sep. 17, 1984, 59-194455

Int. Cl.[4] G11B 5/016, 5/596, 21/20

U.S. Cl. 360—104 3 Claims



1. An apparatus for data transfer with a double sided flexible magnetic disk, comprising:

(a) disk drive means for imparting a predetermined direction of rotation to the magnetic disk in a preassigned data transfer position, the disk drive means including a contact surface for direct contact with the magnetic disk during its rotation;

(b) carriage means controllably movable radially of the magnetic disk being held in the data transfer position;

(c) a first flexure seat of planar shape on the carriage means;

(d) a first magnetic transducer head assembly mounted on the first flexure seat and thereby resiliently supported on the carriage means, the first head assembly having a gapped disk engaging surface for contact with one side of the magnetic disk, the disk engaging surface being parallel to the first flexure seat, the first flexure seat being so mounted to the carriage means that the disk engaging surface of the first head assembly is at an angle to a reference plane containing the contact surface of the disk drive means, the disk engaging surface of the first head assembly slanting away from the reference plane in a direction anywhere between a first extreme direction oriented radially inwardly of the magnetic disk from the first head assembly and a second extreme direction extending from the first head assembly tangentially of a notional circle drawn concentrically on the magnetic disk, the second extreme direction being oriented upstream of the magnetic disk with respect to the predetermined direction of rotation thereof;

(e) a second flexure seat on the carriage means; and

(f) a second magnetic transducer head assembly mounted on the second flexure seat and thereby gimbaled on the carriage means, the second head assembly having a gaped disk engaging surface for contact with the other side of the magnetic disk, the disk engaging surfaces of the first and second transducer head assemblies being substantially in register with each other when in contact with the magnetic disk.

4,709,286

SUPPORTING MEANS FOR SUPPORTING A MAGNETIC TRANSDUCER FOR A DOUBLE SURFACE TYPE FLEXIBLE DISK APPARATUS

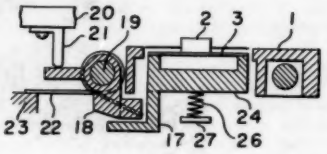
Kazuo Kolke, Koriyama, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 13, 1986, Ser. No. 829,074

Claims priority, application Japan, Jun. 11, 1985, 60-126664; Jun. 11, 1985, 60-126665; Jun. 13, 1985, 60-128673; Jun. 14, 1985, 60-129507

Int. Cl.[4] G11B 5/54, 5/016

U.S. Cl. 360—105 11 Claims



1. A double surface type flexible disk apparatus comprising:

(a) a carriage;

(b) a first arm flexibly mounted on said carriage;

(c) a second arm flexibly mounted on said carriage and extending generally parallel to and in opposition to said first arm;

(d) first means for biasing said first arm toward said second arm;

(e) second means for biasing said second arm toward said first arm;

(f) a first magnetic transducer mounted on said first arm;

(g) a second magnetic transducer mounted on said second arm in opposition to said first magnetic transducer;

(h) a guide rod having an axis extending perpendicularly to the direction of motion of said first arm;

(i) a lever mounted on said guide rod and having a first end and a second end, both of which extend outwardly from said guide rod, said lever being rotatable about the axis of said guide rod between a first position in which it does not contact said first arm and a second position in which it has contacted said first arm and moved it away from said second arm against the bias of said first means;

(j) third means for biasing said first end of said lever toward said first arm, said third means being more powerful than said first means;

(k) a bridge movable between a first position and a second position in a direction at least generally parallel to the direction of motion of said first arm; and

(l) a rod-like piece mounted on said bridge, said rod-like piece being sized, shaped, and positioned so that:

(i) when said bridge is in its first position, said rod-like piece contacts said second end of said lever and prevents said third means from moving said lever from its first position to its second position and,

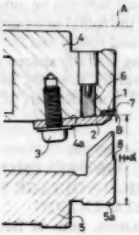
(ii) when said bridge is in its second position, said rod-like piece permits said third means to cause said lever to move from its first position to its second position, thereby moving said first arm away from said second arm.

4,709,287

HEAD HEIGHT ADJUSTMENT CONSTRUCTION IN MAGNETIC RECORDING AND REPRODUCING APPARATUS WITH ROTARY CYLINDER

Tatsumaro Yamashita, Shibata, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Sep. 5, 1985, Ser. No. 772,851
Claims priority, application Japan, Sep. 5, 1984, 59-133938[U]
Int. Cl.[4] G11B 5/52
U.S. Cl. 360—109 2 Claims



1. A head height adjustment construction in a magnetic recording and reproducing apparatus in which a magnetic tape travels in sliding contact in an oblique, downwardly inclined direction across a magnetic head mounted in an outer peripheral surface of a rotary head cylinder, wherein the head cylinder is taken as being oriented with its cylindrical axis along a vertical direction, comprising:

(a) said head cylinder having a lower fixed drum, and an upper rotary drum axially spaced from and rotatable with respect to said lower fixed drum, said upper rotary drum having a lower surface facing said lower fixed drum which has on a radial portion thereof, adjacent the outer peripheral surface of the head cylinder, a tapered mounting surface which is inclined in an upward and radially outward direction;

(b) a head attachment plate having one end mounted to said upper rotary drum on said tapered mounting surface and supporting the magnetic head on an opposite end thereof such that a head surface of the magnetic head is pointed substantially in the upward, radially outward direction of the tapered mounting surface; and

(c) adjustment means disposed in the lower surface of said upper rotary drum for making small adjustments of said head attachment plate away from said tapered mounting surface,

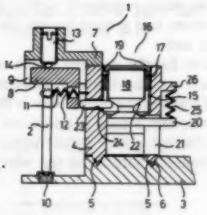
whereby when the head height of the magnetic head is adjusted by spacing the head adjustment plate away from the tapered mounting surface, the head surface of the magnetic head can be maintained pointed at an upward angle relative to a horizontal plane of the head cylinder such that the head surface is kept in reliable contact with the obliquely downwardly moving tape in order in avoid any spacing loss reducing a reproduced output produced from the magnetic tape.

4,709,288

ADJUSTING MEANS IN PARTICULAR FOR GUIDE ELEMENTS, AND MAGNETIC TAPE CASSETTE POSSESSING SUCH MEANS

Norbert Schieffer, Deidesheim; Günter Bettinger, Schifferstadt; Klaus Goetz, Neustadt; Dietmar Pfefferkorn, Hemsbach; Ottmar Bürkle, Offenburg; Kurt Schmidts, Kehl, all of Fed. Rep. of Germany; Pierre Schneider, Erstein, France; Werner Wagner, Oberkirch, Fed. Rep. of Germany; Dieter Wiethölter, Glen, France; Herbert Dietze, Berghaupten, and Wilhelmus Andriessen, Wachenheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 519,592, Aug. 2, 1983, abandoned. This application Jan. 16, 1986, Ser. No. 874,832
Claims priority, application Fed. Rep. of Germany, Aug. 4, 1982, 8222016[U]
Int. Cl.[4] G11B 23/04, 15/60
U.S. Cl. 360—130.21 7 Claims



1. A magnetic tape cassette, in particular a compact cassette, having

two horizontal walls, namely a top wall and a bottom wall,

a plurality of vertical walls including a front wall having an opening for the admission of at least one magnetic head,

guide means for the tape including at least one guide pin disposed laterally of one end of said opening, one end of said guide pin being fixed in one of said horizontal walls and the other end of said guide pin being a free end,

a manually settable adjustment mechanism for adjusting the inclination of said guide pin in a selectable single vertical plane, said adjustment mechanism being in the form of a self-contained unit comprising a mounting block which, itself, is positionable relatively to said horizontal walls and, carried by said block, a micrometer screw device and a circular cam member having an annular groove with at least one inclined surface, said member being provided at one end of said adjustment device for axial displacement thereby,

a linkage controlled by said circular cam member and engaging said free end of the guide pin for varying the inclination of said pin in said selectable single vertical plane, and

means for selectively securing said mounting block and hence said manually settable adjustment mechanism on one of said horizontal walls in one of a plurality of vertical planes, and for allowing the plane in which the inclination of said guide pin is adjusted by said mechanism to be altered by enabling the mounting block to be moved to and secured in a different one of said plurality of vertical planes.

4,709,289

TAPE GUIDE CONSTRUCTION OF A HEAD DRUM OF A VIDEOCASSETTE RECORDER

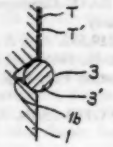
Young H. Kim, Suwon, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea

Filed Jul. 9, 1986, Ser. No. 883,783

Claims priority, application Rep. of Korea, Jul. 9, 1985, 8573/1985

Int. Cl.[4] G11B *15/61*

U.S. Cl. 360—130.24 **1 Claim**



1. A tape guide construction of a head drum of a videocassette recorder comprising:

a V-shaped groove helically formed, with a certain helix angle, at an outer peripheral surface of a lower drum of the head drum, said groove having certain included angle and width; and

a circular wire fixedly engaged in the entire length of said groove, said wire having such diameter that a portion of the peripheral surface of the wire is disposed outside said groove, whereby a tape is contacted at the lower edge thereof with and guided by the upper-protruded portion of the peripheral surface of the wire, during the travel thereof.

4,709,290

TAPE CASSETTE, IN PARTICULAR A MAGNETIC TAPE CASSETTE, AND A SUPPORT LINER THEREFOR

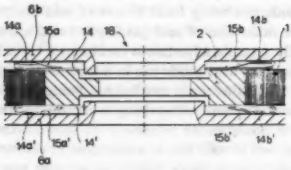
Klaus Schoettle, Heidelberg; Roland Sold, Mutterstadt; Uwe Brinkmann, Kehl, and Werner Wagner, Oberkirch, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 16, 1985, Ser. No. 691,852

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1984, 8401561[U]

Int. Cl.[4] G11B *23/02*

U.S. Cl. 360—132 **15 Claims**



1. A tape cassette, in particular a magnetic tape cassette, having top and bottom walls, one or more rolls of tape on a hub or on a flanged reel, onto which tape can be wound or from which tape can be unwound, one or more support liners between the rolls(s) of wound tape and the bottom wall and between the said roll(s) and the top wall, each support liner having a planar middle part and folded longitudinal edge strips disposed laterally on opposite sides of the middle part, wherein each longitudinal edge strip is bent over into an overlying relationship with the middle part so that at least that portion of each strip adjacent to its associated middle part makes an angle of less than 90° with the plane of the middle part of the liner and so that the said edge strips of each liner support the middle part of the liner against the roll(s) of tape, within the periphery of said middle part.

10. A support liner for a tape cassette, in particular a magnetic tape cassette, the tape cassette having top and bottom walls and one or more rolls of tape on a hub or on a flanged reel onto which tape can be wound or from which tape can be unwound, the support liner having longitudinal strips which are bent over or folded over into an overlying relationship with a middle part of said liner with a portion of said middle part and strips being designed to be positioned in the tape cassette between the roll of wound tape and the bottom wall or between the said roll and the top wall, wherein the support liner is provided with at least two bent-over longitudinal strips and, when the said strips are supported on a flat surface, and one or more rolls of tape are placed in position, the support liner remains substantially parallel to the flat surface.

15. A tape cassette having top and bottom walls, at least one roll of tape on at least one hub or flanged reel onto which tape can be wound or from which tape can be unwound and at least one support liner between the roll(s) of wound tape and the top wall and/or between the said roll(s) and the bottom wall, the or each support liner having laterally spaced apart longitudinal edge portions folded inwardly towards each other into an overlying relationship with a middle part of said liner.

4,709,291

PROTECTIVE DEVICE FOR PREVENTING BLOWOUT OF BUSHING IN HIGH-VOLTAGE SWITCHING INSTALLATION

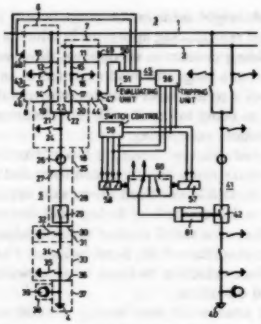
Horst Eggert, and Willi Olsen, both of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Sep. 5, 1985, Ser. No. 772,953

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1984, 3433362

Int. Cl.[4] H02H *7/00*

U.S. Cl. 361—2 **7 Claims**



1. In a high-voltage switching installation insulated with compressed gas and having a metal encapsulation, said metal encapsulation including a plurality of gas-tight compartments partitioned off from one another by bulkhead bushing insulators, a protective device for facilitating servicing work on the switching installation by preventing the bursting of a selected bulkhead bushing insulator upon the removal of gas pressure from one side of the selected bulkhead bushing insulator during a servicing operation, said protective device comprising:

monitoring means for generating a detection signal upon detecting the presence of an electrical arc within a pressurized gas-tight compartment insulated by the selected bulkhead bushing insulator and housing voltage-carrying conductor elements, said monitoring means including at least one sensor attachable to an outer surface of the metal encapsulation at said pressurized gas-tight compartment;

evaluating means operatively connected to said monitoring means for determining that an electrical arc sensed by said monitoring means is an interference arc and for generating an enabling signal upon determining the existence of an interference arc;

voltage cut-off means including a feed switch operatively connected to said voltage-carrying conductor elements for controlling the flow of current thereto;

tripping means operatively coupled to said evaluating means and to said voltage cut-off means for opening said feed switch to interrupt the flow of current to said voltage-carrying conductor elements in response to said enabling signal; and

blocking means operatively coupled to said tripping means for at least temporarily preventing a reclosing of said feed switch upon an opening thereof by said tripping means.

4,709,292

TROUBLE DETECTOR APPARATUS FOR AN AIR-CONDITIONER INCLUDING A COUNTER AND A TIMER

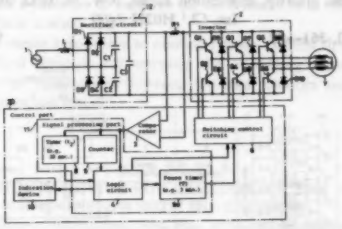
Keiichi Kuriyama, Kusatsu; Kenichiro Miura, Otsu, and Takashi Deguchi, Kusatsu, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Dec. 21, 1984, Ser. No. 684,724

Claims priority, application Japan, Dec. 23, 1983, 58-246097

Int. Cl.[4] H02H *7/08*

U.S. Cl. 361—22 **9 Claims**



1. A trouble detection apparatus for an air-conditioner system, comprising:

a circuit for driving a compressor of an air conditioner;

means for detecting overcurrent conditions in which current value above a predetermined value of current is flowing in said circuit for driving an air-conditioner;

means for disabling said circuit for driving an air conditioner when at least two of said overcurrent conditions are detected within a predetermined time after turn-on of a compressor of an air-conditioning system; said circuit for driving a compresor of an air conditioner including inverter means for feeding variable frequency AC current to a compressor,

and said detecting means comprises:

current value signal generating means to produce a current value signal indicative of a current value in said inverter means;

comparator means to generate an overcurrent detection signal by comparing a current value signal indicative of a current value in said inverter means with a predetermined reference value,

and wherein said disabling means includes:

(a) timer means to count a first predetermined time period, which is chosen so that at a termination of said first time period after an initial start of a compressor, the operation of a compressor has become substantially stable, and producing a time-up signal indicative of said termination of aid first time period,

(b) means to count a number of overcurrent conditions which take place within said first predetermined time period from a starting of operation of a compressor,

(c) logic means which issues a stopping signal which terminates the operation of a compressor when said counted number of overcurrent conditions exceeds a predetermined number, and

(d) pause timer means to count a pause time from a stop of the operation of a compressor to allow a stabilizing of a compressor for stable re-starting of a compressor, and for generating a re-starting signal at the end of a predetermined pause time, and

switching control means for operatively controlling said inverter means to generate a variable AC current to terminate and initiate operation of a compressor in response to said stopping signal from said logic means, and said re-starting signal from said pause timer means, respectively.

4,709,293

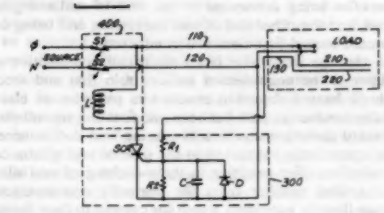
SHOCK HAZARD PROTECTION SYSTEM

Bernard Gershen, Centerport; Saul Rosenbaum, East Meadow, and James N. Pearse, Dix Hills, all of N.Y., assignors to Leviton Manufacturing Company, Inc., Little Neck, N.Y.

Continuation of Ser. No. 880,396, Jun. 30, 1986, abandoned, which is a continuation of Ser. No. 558,260, Dec. 5, 1983, abandoned. This application Jan. 9, 1987, Ser. No. 1,715

Int. Cl.[4] H02H *3/16*

U.S. Cl. 361—50 **15 Claims**



1. In combination with an electrical appliance operatively connected to an A-C source by a cord set including a first and second electrical conductor each having a source end and an appliance end, respectively, and a plug compatible with said A-C source, a shock hazard preventing circuit comprising:

a third electrical conductor having a source end and an appliance end;

a first and second shock hazard detection conductor each having a connected end and an unconnected end, respectively, positioned in a non-contacting relationship and contained within said appliance, the connected end of said first shock hazard detection conductor being connected to the appliance end of said first electrical conductor, the connected end of said second shock hazard detection conductor being connected to the appliance end of said third electrical conductor, and the unconnected ends of said first and second shock hazard detection conductors being maintained in a spaced-apart relationship;

an interrupting circuit contained within said plug and including an energizing coil and a first and second switch responsive to the flow of current through said energizing coil, said first switch being operable between a normally closed position and a shock hazard condition open position and connected in-line with said first electrical conductor, and said second switch being operable between a normally closed position and a shock hazard condition open position and connected in-line with said second electrical conductor;

a switching control circuit contained within said plug and including a silicon controlled rectifier operable between a normally non-conducting state and a shock hazard condition conducting state, a first resistor connected in series

between the gate of said silicon controlled rectifier and the source end of said third electrical conductor, a diode circuit connected between the gate and cathode of said silicon controlled rectifier, wherein said diode circuit comprises a zener diode connected in series with a second diode, the anode of said zener diode being operatively connected to the gate of said silicon controlled rectifier, and the anode of said second diode being operatively connected to the cathode of said silicon controlled rectifier, a charging capacitor connected between the gate and cathode of said silicon controlled rectifier, a first charging circuit connected between the appliance end of said first electrical conductor and the appliance end of said third electrical conductor, a second charging circuit connected between the source end of said first electrical conductor and the gate of said silicon controlled rectifier, and a first diode connected in series between the connected end of said second shock hazard detection conductor and the appliance end of said third electrical conductor, wherein said first charging circuit comprises a first charging resistor connected in series with a first charging diode, the cathode of said first charging diode being operatively connected to the appliance end of said first electrical conductor, and said second charging circuit comprises a second charging resistor connected in series with a second charging diode, the cathode of said second charging diode being operatively connected to the gate of said silicon controlled rectifier, the cathode of said silicon controlled rectifier being connected to the source end of said second electrical conductor, the anode of said silicon controlled rectifier being connected to one end of said energizing coil, and the other end of said energizing coil being connected to said first electrical conductor;

such that the immersion in an electrically conductive medium of the unconnected ends of said first and second shock hazard detection conductors provides an electrically conductive path between said first and second shock hazard detection conductors causing said A-C source to be operatively connected to the gate of said silicon controlled rectifier resulting in the switching of said silicon controlled rectifier from the normally non-conducting state thereby providing a path for current to flow through said energizing coil and causing said first and second switches to switch from the normally closed position to the shock hazard condition open position and thus operatively disconnecting said A-C source from said electrical appliance.

4,709,294

DEVICE FOR CONTACT PROTECTION AND ARC PREVENTION OF A SWITCH

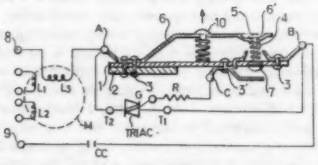
In Suk Kim, 134-21, Cheongdam-dong, Kangnam-ku, Samik Apt., 10-Block No. 615, Seoul, Rep. of Korea

Filed Aug. 27, 1985, Ser. No. 769,877

Claims priority, application Rep. of Korea, Aug. 27, 1984, 84-5220; Jun. 21, 1985, 85-4424

Int. Cl.[4] H02H *9/02*

U.S. Cl. 361—58 **5 Claims**



1. A device for preventing contact defacing and arc prevention in a switch which comprises:

a insulating plate,

a right fixed terminal (A) disposed at a right end portion of the insulating plate (1), said right fixed terminal (A) being connected to an auxiliary winded wire (L3) which extends to a power source terminal (8), and a second triac (T2),

a left fixed terminal (B) disposed at a left end portion of said insulating plate (1), said left fixed terminal (B) being connected to a power source terminal (9) and a first triac (T1),

a fixed terminal (C) disposed intermediate said terminals (A) and (B) and on the opposite sides of said insulating plate, said fixed terminal (C) being connected to a triac gate (G) disposed between the first and second triacs (T_1) and (T_2) through a resistance (R),

a movable plate (6) attached to the insulating plate (1), and

a switching knob (10) connecting the movable plate (6) to the insulating plate (1), said switching knob (10) in turn being connected to the centrifugal switch of a motor, whereby in operation the right fixed terminal (A) and second triac (T2), are first connected to the center fixed terminal (C) and triac gate (G), and then are connected to the left fixed terminal (B) and first triac (T1) for the prevention of arcing and contact defacing when th current is cut off.

4,709,295

DIGITAL PROTECTIVE RELAY SYSTEM

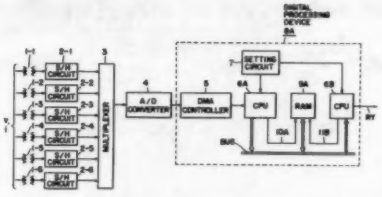
Mitsuru Yamaura, Hachioji; Junichi Inagaki, and Hachidai Ito, both of Fuchu, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 20, 1984, Ser. No. 673,419

Claims priority, application Japan, Nov. 24, 1983, 58-219560

Int. Cl.[4] H02H *3/00*

U.S. Cl. 361—80 **9 Claims**



1. A digital protective relay system for protecting an electric power system, said relay system comprising:

at least one first digital operation device receiving digital data on electrical quantities such as voltages and/or currents of the power system and performing discriminating operations based on said digital data to produce discrimination results relating to conditions of the power system,

at least one memory unit connected to said first digital operation device for receiving said discrimination results to store the same therein, and

at least one second digital operation device connected to said memory unit to receive said discrimination results for performing a logical operation in which said discrimination results are combined to determine whether or not a trip signal should be generated and for generating and outputting said trip signal as an output of said digital protective relay system when it is determined that said output signal should be generated,

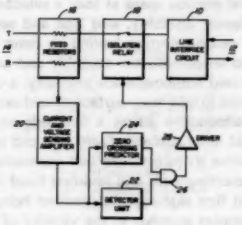
wherein said discrimination operations and logical operation of said digital protective relay system are divided between said at least one first operation device and said at least one second digital operation device in such a manner that said discrimination operations are performed only by said at least one first operation device and said logical operation and generation of said trip signal are performed only by said at least one second digital operation device.

4,709,296

PROTECTION ARRANGEMENT FOR A TELEPHONE SUBSCRIBER LINE INTERFACE CIRCUIT

Francis Y. Hung, Kanata, and Frederick C. Livermore, Stittsville, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jun. 20, 1985, Ser. No. 747,581
Int. Cl.[4] H04M 3/18; H02H 3/093
U.S. Cl. 361—102 18 Claims



1. Apparatus comprising a telephone subscriber ine interface circuit, two feed resistors for coupling the line interface circuit to a two wire telephone subscriber line, and a protection arrangement comprising:

switching means between the feed resistors and the line interface circuit, the switching means being closed in normal operation to connect the feed resistors to the line interface circuit; and

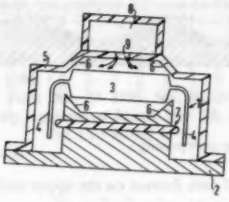
control means responsive to common mode current through the feed resistors for opening the switching means to interrupt connections between the feed resistors and the line interface circuit.

4,709,297

GUIDING DEVICE FOR SEMICONDUCTOR COMPONENTS WITH DIL CASINGS

Albert Walther, Holzkirchen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 20, 1985, Ser. No. 747,112
Claims priority, application Fed. Rep. of Germany, Jun. 29, 1984, 3424048
The portion of the term of this patent subsequent to Jan. 21, 2003, has been disclaimed.
Int. Cl.[4] H02H 1/00; B65D 73/02
U.S. Cl. 361—212 13 Claims



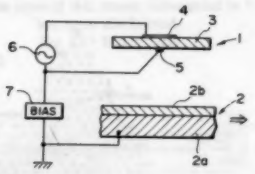
1. Guiding device for semiconductor components with DIL casings having edges and surfaces adjoining the edges, comprising a housing, means disposed in said housing for protecting the semiconductor components against electrostatic charging and discharging, said housing having at least one guiding surface extending in longitudinal direction of said housing being inclined relative to the casing surfaces adjoining the casing edges preventing surface friction and limiting contact between said housing and the casing to contact regions between said guiding surface and the casing edges.

4,709,298

METHOD AND DEVICE FOR CHARGING OR DISCHARGING A MEMBER

Nagao Hosono, Hachiohji; Yukio Nagase; Tatsuo Takeuchi, both of Tokyo; Hidemi Egami, Zama, and Hiroshi Satomura, Hatogaya, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 618,249, Jun. 7, 1984, abandoned. This application Jul. 3, 1986, Ser. No. 882,206
Claims priority, application Japan, Mar. 26, 1984, 59-57705; Jun. 6, 1984, 59-114500
Int. Cl.[4] H05F 3/04
U.S. Cl. 361—213 10 Claims



1. A device for charging or discharging a member, comprising:

a discharging member including a solid dielectric member having first and second surfaces extending in a direction, an inducing electrode extending in said direction along said first surface of said solid dielectric member, said inducing electrode having a width smaller than that of said first surface of said solid dielectric member, and a discharging electrode extending in said direction along said second surface of said solid dielectric member, said discharging electrode having a width smaller than that of said second surface of said solid dielectric member, said solid dielectric member being sandwiched between each inducing electrode and said discharge electrode, said inducing electrode and said discharging electrode are in contact with said solid dielectric member, wherein said discharging electrode has an exposed side and has a width, measured in a direction perpendicular to said direction, that is smaller than that of the inducing electrode, and wherein said exposed side of said discharging electrode is adapted to be opposed to a member to be charged or discharged; and

a power source for applying an alternating voltage between said inducing electrode and said discharging electrode to produce a surface discharge on said second surface of said solid dielectric member adjacent said discharging electrode wherein the width of an area where the surface discharge is produced is substantially equal to the width of said inducing electrode.

4,709,299

LOW TEMPERATURE SINTERED CERAMIC CAPACITOR WITH A TEMPERATURE COMPENSATING CAPABILITY, AND METHOD OF MANUFACTURE

Hiroshi Kishi, Fujioka; Minoru Oshio, Gunma; Shunji Murai, Gunma; Takeshi Wada, Gunma, and Masami Fukui, Gunma, all of Japan, assignors to Taiyo Yuden Co., Ltd., Tokyo, Japan

Filed Nov. 25, 1986, Ser. No. 934,667
Claims priority, application Japan, Nov. 30, 1985, 60-270543
Int. Cl.[4] C04B 35/46; H01G 4/12
U.S. Cl. 361—321 9 Claims

1. A low temperature sintered solid dielectric capacitor comprising a dielectric ceramic body and at least two electrodes in contact therewith, the dielectric ceramic body consisting essentially of:

100 parts by weight of a major ingredient expressed by the formula,

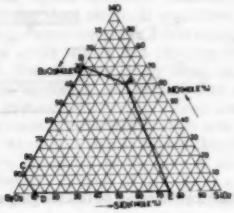
$(CaO)_k(Zr_{1-x}Ti_xO_2$

where

k is a numeral in the range of 0.8 to 1.3 inclusive; and

x is a numeral in the range of zero to 0.3 inclusive; and

from 0.2 to 10.0 parts by weight of an additive mixture of boric oxide, silicon dioxide and at least one metal oxide selected from the group consisting of barium oxide, magnesium oxide, zinc oxide, strontium oxide and calcium oxide, the relative proportions of boric oxide, silicon dioxide and at least one selected metal oxide constituting the additive mixture being in that region of the ternary diagram of FIG. 2 attached hereto which is bounded by the lines sequentially connecting:



the point A where the additive mixture consists of 15 mole percent boric oxide, 25 mole percent silicon dioxide, and 60 mole percent metal oxide;

the point B where the additive mixture consists of 30 mole percent boric oxide, zero mole percent silicon dioxide, and 70 mole percent metal oxide;

the point C where the additive mixture consists of 90 mole percent boric oxide, zero mole percent silicon dioxide, and 10 mole percent metal oxide;

the point D where the additive mixture consists of 90 mole percent boric oxide, 10 mole percent silicon dioxide, and zero mole percent metal oxide; and

the point E where the additive mixture consists of 25 mole percent boric oxide, 75 mole percent silicon dioxide, and zero mole percent metal oxide.

4,709,300

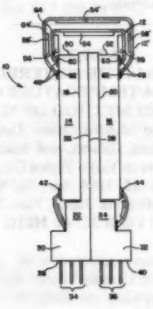
JUMPER FOR A SEMICONDUCTOR ASSEMBLY

Richard C. Landis, Shelton, Conn., assignor to ITT Gallium Arsenide Technology Center, a division of ITT Corporation, Roanoke, Va.

Filed May 5, 1986, Ser. No. 859,962

Int. Cl.[4] H01R *9/00*

U.S. Cl. 361—398 **11 Claims**



1. A jumper interconnecting a first set of connecting pads disposed on one surface of a semiconductor assembly with a second set of connecting pads disposed on an opposite surface of said semiconductor assembly, said jumper comprising a plurality of electrically conductive strips arranged one behind the other in a row, each of said strips having a first end portion connected to a corresponding one of said pads of said first set of connecting pads, a second end portion connected to a corresponding one of said pads of said second set of connecting pads and a central portion connected to said first end portion by a first bend and to said second end portion by a second bend such that said central portion spans at least a substantial portion of said semiconductor assembly, said first and second end portions and said central portion having an outer surface facing away from said semiconductor assembly and an inner surface facing toward said semiconductor assembly; a central support member attached to said inner surface of said central portion of each of said conductive strips; a first side support member attached to said inner surface of said first end portion of each of said conductive strips between said connecting pads of said first set of connecting pads and said first bend in said conductive strips, said first side support member being spaced from said central support member in the vicinity of each said first bend to thereby relieve stresses produced by the bending of each of said conductive strips to form said first bend therein, whereby the mechanical forces operating to straighten said conductive strips and to separate them from said first set of connecting pads are reduced; and a second side support member attached to said inner surface of said second end portion of each of said conductive strips between said connecting pads of said second set of connecting pads and said second bend in said conductive strips, said second side support member being spaced from said central support member in the vicinity of each said second bend to thereby relieve stresses produced by the bending of each of said conductive strips to form said second bend therein, whereby the mechanical forces operating to straighten said conductive strips and to separate them from said second set of connecting pads are reduced.

4,709,301

PACKAGE

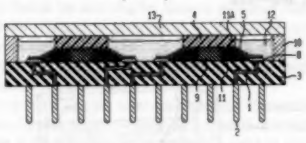
Yukio Yamaguti, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Aug. 26, 1986, Ser. No. 900,532

Claims priority, application Japan, Sep. 5, 1985, 60-197007; Dec. 6, 1985, 60-273368; Dec. 6, 1985, 60-273369

Int. Cl.[4] H02B *1/00*; H05K *7/20*

U.S. Cl. 361—387 **32 Claims**



1. A package comprising:

a substrate;

a plurality of pads formed on the upper surface of said substrate;

at least one electronic component having a plurality of leads to be connected to said pads and mounted on the upper surface of said substrate;

a fluid silicone material filled in a space surrounded by said leads, the lower surface of said electronic component and the upper surface of said substrate; and

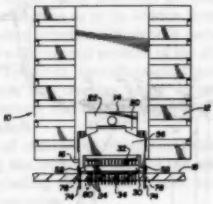
a hardened silicone material which covers the upper surface of said substrate and the fluid silicone material and exhibits a lower viscosity than said fluid silicone material before the hardened silicone material is hardened.

4,709,302

ALIGNMENT APPARATUS FOR ELECTRONIC DEVICE PACKAGE

William D. Jordan, Dallas, and Donald L. Clemens, The Colony, both of Tex., assignors to Thermalloy Incorporated, Dallas, Tex.

Filed Dec. 16, 1986, Ser. No. 942,097
Int. Cl.[4] H05K 7/20
U.S. Cl. 361—388 20 Claims



1. Alignment apparatus for use in connection with printed circuit boards, heat sinks and electronic device packages having pin connectors and the like, said apparatus comprising:

(a) an electrically insulating body having connection means for releasably connecting said body to a heat sink and having a plurality of holes extending through said body for receiving, aligning and retaining the pin connectors of an electronic device package in a predetermined relationship;

(b) solderable securing and attachment means attached to said body and shiftable with respect to said body between a first position for loading and unloading the electronic device package from said body and a second position with respect to said body including;

(i) means for securing the electronic device package in intimate thermal contact with the heat sink when said solderable securing and attachment means is in said second position; and

(ii) means for mounting the alignment apparatus, the heat sink and electronic device package on a printed circuit board with the pin connectors of the electronic device package presented for soldering to preformed locations on the printed circuit board; and

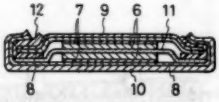
(c) means for releasably latching said solderable securing and attachment means to said body in said second position.

4,709,303

ELECTRIC DOUBLE LAYER CAPACITOR

Makoto Fujiwara; Hajime Yoneda, and Masafumi Okamoto, all of Kyoto, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

PCT No. PCT/JP85/00706, § 371 Date Aug. 22, 1986, § 102(e) Date Aug. 22, 1986, PCT Pub. No. WO86/03884, PCT Pub. Date Jul. 3, 1986
PCT Filed Dec. 24, 1985, Ser. No. 903,566
Claims priority, application Japan, Dec. 25, 1984, 59-277221
Int. Cl.[4] H01G 9/00
U.S. Cl. 361—433 5 Claims



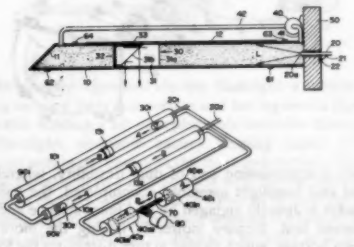
1. An electric double layer capacitor, which comprises a polarizable electrode having a conductive electrode on one side thereof, a counter electrode provided on the other side of said polarizable electrode, an electrolytic solution, a separator arranged between the polarizable and counter electrodes, and two metallic pieces which sealingly encase said polarizable electrode and said counter electrode and which are electrically interconnected with the polarizable and counter electrodes, respectively, at least one metallic piece being located at the side of the polarizable electrode and being provided with an aluminum layer on a surface contacting the conductive electrode and the electrolytic solution.

4,709,304

LIGHT RADIATOR

Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan

Filed Aug. 26, 1985, Ser. No. 769,531
Claims priority, application Japan, Sep. 7, 1984, 59-188674
The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.
Int. Cl.[4] F21V 7/04
U.S. Cl. 362—32 6 Claims



1. A light radiator comprising a transparent cylinder means, an optical conductor means for guiding light rays into said transparent cylinder means through one end of said transparent cylinder means, an optical means movably accommodated in said transparent cylinder means for reflecting said light rays guided into said transparent cylinder means from said optical conductor means and radiating said light rays outside of said transparent cylinder means, a driving means for moving said optical means along an axial direction of said transparent cylinder means, said driving means comprising first and second liquid pumps consisting of a pump piston means and a pump cylinder means, a driving means for reciprocally moving the pump piston means of said first and second liquid pumps, a first liquid-supplying pipe connected with one end portion of said pump cylinder means, a second liquid-supplying pipe connected with the other end portion of said pump cylinder means, and optical oil placed in said first and second pumps and said pump cylinder means, said first liquid pump discharging said optical oil outside thereof and said second liquid pump drawing in said optical oil from said pump cylinder means at the time of operating said first and second liquid pumps.

4,709,305

ELECTRICAL CONNECTOR FOR HEADLIGHT ASSEMBLY

David R. McMahan, and John D. Geddie, both of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

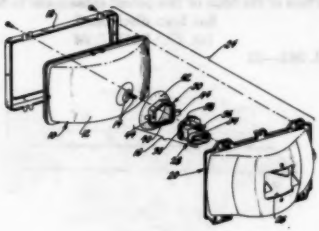
Filed Oct. 3, 1986, Ser. No. 915,047
Int. Cl.[4] B60Q 1/00
U.S. Cl. 362—61 3 Claims

1. In a vehicle headlight assembly of the type having a headlight with a terminal extending from the back surface of said headlight at an angle that varies with manufacturing tolerances, said headlight assembly also having an inner surface that overlies the back surface of said headlight, an improved electrical connector for said headlight that is positively retained to

and sealingly engaged with said headlight and which compensates for said angle variation, comprising,

a socket adapted to be plugged to said headlight before said headlight assembly is completed, said socket being formed of a material sufficiently rigid to maintain a mating terminal in a proper position to matingly engage said headlight terminal as said socket is plugged to said headlight, said socket further having a beam portion extending therefrom that is sufficiently thin so as to be flexible and which underlies said inner surface after said headlight assembly has been completed, and,

a sealing boot surrounding said socket formed of a material less rigid than said socket so as to be conformable to said headlight back surface, said sealing boot having a pocket fitted over said socket beam portion so as to cooperatively



form a compression pad of dual flexibility, whereby, as said said headlight assembly is completed, the less rigid pocket is directly engaged by said inner surface and compressed first, thereby indirectly flexing the more rigid beam portion, which flexing in turn distributes the force of said compression to said socket to positively retain said socket to said headlight, said compression force in turn being distributed through said socket to said surrounding sealing boot so as to conform said sealing boot evenly to said headlight back surface to seal around said headlight terminal, with any variation in the spacing of said socket beam portion from said headlight assembly inner surface being partially absorbed and compensated by the compression of the less rigid sealing boot pocket so as to lessen the impact of the angular variation of said headlight terminals.

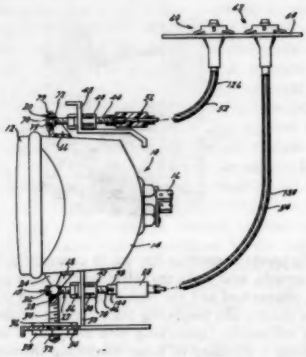
4,709,306

REMOTE ADJUSTING MEANS FOR A VEHICLE HEADLAMP

Gerald A. Harris, Fraser, and Thomas W. Schumacher, Pontiac, both of Mich., assignors to Chrysler Motors, Highland Park, Ill.

Filed Dec. 23, 1985, Ser. No. 812,545
Int. Cl.[4] F21V *3/18*
U.S. Cl. 362—68 **2 Claims**

1. Remote adjusting means for a vehicle headlamp, the headlamp having at least three peripheral mounting means each securable to vehicle structure, one of the mounting means including pivot structure permitting the vehicle headlamp to be adjusted for vertical and horizontal focusing, the other mounting means each including nut and screw structure for said adjustment of the vehicle headlamp, a flexible cable connected at one end to each nut and screw structure, each of said other two mounting means comprising a nut fixedly and non-rotatably securable to vehicle structure, a screw threadably engaging the nut, bracket structure on the vehicle headlamp, the screw being fixedly and freely rotatably connected to the bracket structure, one of the cables being connected to the screw for threading thereof into and out of the nut for said adjustment of the vehicle headlamp, a connector connecting each cable to each screw, each connector comprising an elongated element having a reentrant opening at each end, each reentrant opening defining a wrench engageable socket, the ends of the screw and cable having wrench engageable heads thereon, each of the heads being non-rotatably received in one of the sockets whereby turning of the cable will result in turning of the screw, a tubular portion of smaller diameter than the threaded portion of the screw extending axially outwardly from the reentrant opening which receives the head of the screw, said tubular portion having axially extending slits therein, a threaded portion of the screw being forced fitted into



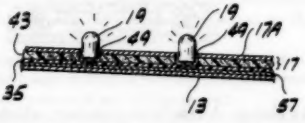
the tubular portion with the slits of the tubular portion permitting sufficient deflection to receive and thereafter grasp the threaded portion retain the threaded portion in place, said cables extending from the nut and screw structures and terminating at the other end at a location remote from the vehicle headlamp, each cable having driving means at the termination thereof permitting rotation of the cable at the remote location to actuate the nut and screw means for said adjustment of the vehicle headlamp.

4,709,307

CLOTHING WITH ILLUMINATED DISPLAY

David E. Branom, St. Louis County, Mo., assignor to McKnight Road Enterprises, Inc., Maryland Heights, Mo.

Filed Jun. 20, 1986, Ser. No. 876,685
Int. Cl.[4] F21L *15/08*
U.S. Cl. 362—103 **11 Claims**



6. An article of clothing comprising:

a shell forming an outerlayer of the article of clothing;

a liner disposed generally inside the shell and forming an inner layer of said article;
a set of light-emitting diodes or the like forming a predetermined pattern on the exterior of the article of clothing, said set being mounted on a substrate;
a power source for illuminating the diodes;
control circuit means for controlling the energization of the diodes;
a pocket in the article of clothing in which the power source is removably disposed;
a cable for electrically connected the diodes and the power source, said cable being disposed generally between the shell and the liner so as to be hidden from view; and
an overlay having imprinted thereon a pattern corresponding to the predetermined pattern of the diodes, said overlay having openings therethrough through which the diodes extend, said overlay being secured to the shell, both the substrate and the overlay being disposed exteriorly of the shell.

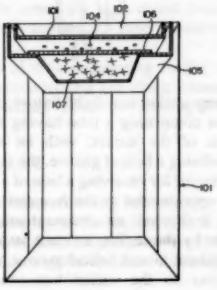
10. An article of exercise clothing comprising:
a shell forming the front and back of the article of clothing, said shell including a bias tape border, said article having relatively open sides;
the front and back fo the article of clothing both having at least one strip of reflective tape secured to the shell to form a predetermined pattern;
the front and back of the article of clothing both having a set of light-emitting diode or the like disposed along the strip of reflective tape to accentuate the predetermined pattern on the exterior of the article of clothing;
a power source for illuminating the diodes;
control circuit means for controlling the energization of the diodes;
a pocket in the article of clothing in which the power source is removably disposed; and
a cable for electrically connecting the diodes and the power source, said cable being disposed generally between the shell and the reflective tape so as to be hidden from view, said cable in extending between the front and back sets of diodes being hidden in the border.

4,709,308

LIGHTING DEVICE FOR AN ELEVATOR

Katsumi Makino, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jun. 30, 1986, Ser. No. 879,956
Claims priority, application Japan, Jul. 1, 1985, 60-144289
Int. Cl.[4] F21V *21/00*
U.S. Cl. 362—148 **7 Claims**



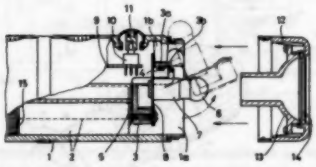
1. A light device for an elevator car having walls comprising a light source for emitting light toward an interior of the elevator car, and a spectral resolution filter element disposed between said light source and the interior of the car having a spectral resolution filter on a surface of said filter element facing the interior of the car transmitting the light emitted from said light source through said filter element and spectrally resolving the light into an image of spectral light with varying colors on the surface of said filter element.

4,709,309

ELECTRIC FLASHLIGHT

Masahiko Yamaki, Sumida, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan

Filed Aug. 20, 1986, Ser. No. 898,327
Claims priority, application Japan, Aug. 20, 1985, 60-126831[U]
Int. Cl.[4] F21L *7/00*
U.S. Cl. 362—199 **6 Claims**



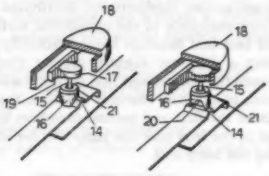
1. In a battery-operated electric flashlight: a tubular casing having an open front end portion and having means therein for releasable holding a set of replaceable batteries during use of the flashlight; pivotable battery keeping means pivotably mounted within the casing at the front end portion thereof for pivotal movement to a first position wherein the battery keeping means engages with the set of batteries to hold the same in the casing and to a second position wherein the battery keeping means is sufficiently clear of the set of batteries so as to permit removal and replacement of the batteries through the open front end of the casing; and a front cover detachably connected to the casing front end portion, the front cover having means for maintaining the battery keeping means in the first position when the front cover is connected to the casing.

4,709,310

SWITCH STRUCTURES IN PORTABLE FLASHLIGHTS

Keiichi Ohashi, Shizuoka, Japan, assignor to Skylite Industry Co., Ltd., Shizuoka, Japan

Filed May 9, 1986, Ser. No. 861,411
Claims priority, application Japan, Jul. 22, 1985, 60-161718
Int. Cl.[4] F21L *7/00*
U.S. Cl. 362—205 **1 Claim**



1. A switch structure in a portable flashlight, which includes:
a body;
a rotating pin extending through a suitable portion of said body;
an O-ring fitted onto said rotating pin to make the through-hole in said body waterproof;
a roller mounted on a portion of said rotating pin extending from said body;
a cap-like slide button fitted thereover;
a keep hook provided at the lower end of said rotating pin; and

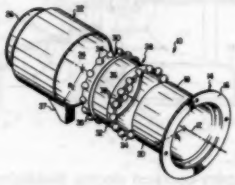
a ratchet formed on one inner face of said slide button, said ratchet being engaged with the outer face of said roller for to-and-fro movement of said slide button, whereby said roller is reciprocally turned through an angle of about 90°, and the resulting rotation is transmitted to said keep hook via said rotating pin.

4,709,311

LENS CARRIER

James M. Bornhorst, Duncanville, Tex., assignor to Vari-Lite, Inc., Dallas, Tex.

Filed Jul. 16, 1986, Ser. No. 887,372
Int. Cl.[4] F21V *17/02*
U.S. Cl. 362—277 **6 Claims**



1. A lens carrier for supporting a lens on a lamp structure in alignment with a lamp axis and for guiding the lens for limited movement along the lamp axis while maintaining alignment, comprising:

a first member secured to the lamp structure and defining a cylindrical exterior surface centered on the lamp axis, said exterior surface being defined at a first radius from the lamp axis;

a second member defining a cylindrical interior surface defined about a center line at a second radius, the lens being mounted on the second member with the optical axis of the lens coincident with the center line of the cylindrical interior surface; and

a bearing assembly having first and second ball retaining rings positioned between the cylindrical surfaces of the first and second members, the ball retaining rings being spaced apart along the length of the surfaces to align the lens with the lamp axis and guide the lens and second member for limited movement along the lamp axis relative to the first member while maintaining alignment;

each of said ball retaining rings having a plurality of ball bearings positioned between the cylindrical surfaces of the first and second members and distributed uniformly about the circumference of the cylindrical surfaces; and

each of said ball bearings being resiliently deformable and having a diameter slightly greater than the difference between the second and first radii to cause resilient deformation of the ball bearings between the cylindrical surfaces of the first and second members to maintain alignment of the lens with the lamp axis for limited movement along the lamp aixs.

4,709,312

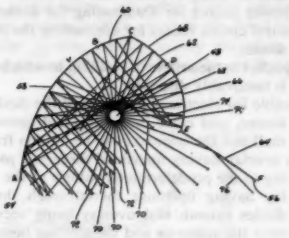
FLOODLIGHT WITH IMPROVED REFLECTOR SYSTEM

Richard V. Heinisch, and Ian Lewin, both of Scottsdale, Ariz., assignors to Ruud Lighting, Inc., Racine, Wis.

Filed Jun. 24, 1986, Ser. No. 877,745
Int. Cl.[4] F21V *7/00*
U.S. Cl. 362—298 **17 Claims**

1. In a floodlight of the type having a straight light line and a reflector surface in a housing and a light-emitting opening plane forward of thel ight line, the improvement wherein the reflector surface comprises a major portion parallel to the light line including:

a parabolic section on one side of the light line with its focus at and its vertex behind and to said one side of the light line, thereby establishing a main beam direction at an acute angle to the opening plane; and



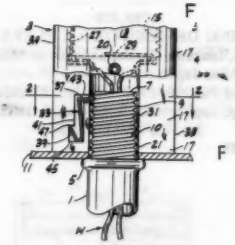
an opposite section on the other side of the light line configured and oriented to reflect light therefrom past the light line onto the parabolic section so its secondary reflection off the parabolic section will be close to the main beam direction.

4,709,313

LAMP SOCKET AND LIGHT FIXTURE CONNECTION

Charles D. Goralnik, 1825 N. 19th St., St. Louis, Mo. 63106

Filed Jan. 21, 1987, Ser. No. 5,613
Int. Cl.[4] F21S *1/12*
U.S. Cl. 362—414 **22 Claims**



1. A lamp socket and light fixture connection, the fixture connection comprising a tube having a free end portion, for application of the socket, with an external screw thread thereon defining a helical groove, the socket having a recess at one end thereof for receiving a base of a light bulb and applicable at an opposite end to the free end portion of the tube by attaching it thereon, an abutment associated with the tube engageable by the socket, a detent associated with the socket for engagement in said helical groove, said detent being movable relative to the socket between a retracted position wherein it may pass by the thread on application of the socket to said threaded end portion of the tube to an extended position where it is in engagement with said helical groove, the socket being rotatable about a central axis with said detent in its said extended position in said helical groove for screwing the socket on said threaded end portion of the tube into firm engagement with said abutment with limited rotation of the socket.

4,709,314

SUPERCONDUCTING RECTIFIER FOR THE CONVERSION OF A RELATIVELY LOW ALTERNATING CURRENT INTO A RELATIVELY HIGH DIRECT CURRENT

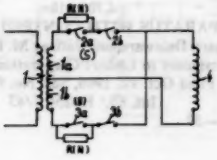
Louis J. M. van de Klundert; Herman H. J. ten Kate; Jan Sikkenga, all of Enschede; Maarten Groenenboom, Enter, and Jacques Lisser, Henhelo, all of Netherlands, assignors to Holec Systemen En Componenten B.V., Netherlands

Filed Jun. 16, 1986, Ser. No. 874,662

Claims priority, application Netherlands, Jun. 19, 1985, 8501762

Int. Cl.[4] H03K 3/38

U.S. Cl. 363—14 12 Claims



1. Superconducting rectifier for the conversion of a relatively low current from an alternating current supply source into a relatively high direct current for supply to a load, comprising:

a transformer including a primary coil for receiving said relatively low current and first and second superconducting secondary coils having a common tap for alternately conducting said relatively high direct current in one direction to said load;

first superconducting switching means being connected between said first secondary coil and said load and second superconducting switching means being connected between said second secondary coil and said load, said first and second superconducting switching means being adapted to be switched independently of one another and each including serially-connected commutating switching portions and blocking switching portions adapted to be closed and opened in dependence on one another to alternately supply the relatively high direct current to said load from said first and second superconducting secondary coils;

the open condition of the commutating portion of said first and second superconducting switching means each producing a commutating resistance fulfilling the following condition:

$$R \geq (dI/dt)_{max} \times L_{eff}/I;$$

said commutating resistance being substantially lower than the blocking resistance of each of said first and second blocking portions of said first and second superconducting switching means during the open condition of the respective blocking portions, wherein

R=the resistance of the commutating portion of each of said first and second superconducting switching means during the open condition thereof;

dI/dt=the maximum permissable current change per unit time;

L_{eff}=the effective inductance of the superconducting rectifier; and

I=the instantaneous value of the secondary rectifier current.

4,709,315

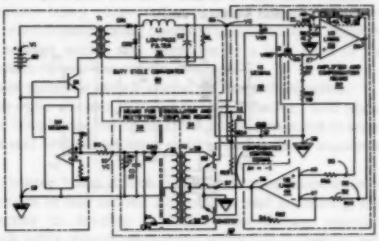
ISOLATED CONTROLLER CIRCUIT

Richard Ramos, Placentia, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 24, 1986, Ser. No. 934,516

Int. Cl.[4] H02M 3/335

U.S. Cl. 363—21 11 Claims



1. An isolated controller circuit responsive to an input signal voltage from the output of a low-pass filter referenced to an isolated reference potential, said input signal voltage having a ripple frequency component, said ripple frequency component having a dominant fundamental frequency, said isolated controller circuit providing a control signal at a signal output terminal referenced to a non-isolated reference potential comprising:

a reference signal source referenced to said isolated reference potential for providing a reference signal;

amplifier and compensation means for amplifying and compensating the signal difference between said input signal and said reference signal to provide a compensated control signal referenced to said isolated reference potential;

oscillator and coupling means responsive to said compensated control signal for providing a switched compensated control voltage referenced to said non-isolated reference potential, the isolation between said isolated and said non-isolated reference potential being preserved; and

a rectifier filter means for rectifying and filtering the switched compensated control voltage developed across said secondary to provide said control signal at said output terminal referenced to said non-isolated reference potential.

4,709,316

SINGLE-ENDED DC-TO-DC CONVERTER WITH LOSSLESS SWITCHING

Khai D. T. Ngo, Schenectady, and William A. Peterson, Vestal, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 27, 1985, Ser. No. 813,810

Int. Cl.[4] H02M 3/335

U.S. Cl. 363—21 7 Claims

1. A DC-to-DC converter comprising:

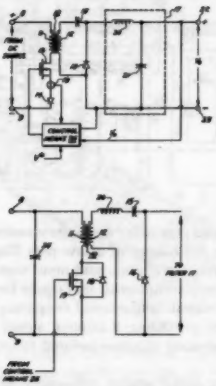
a transformer having a primary winding and a secondary winding;

a resonance capacitor connected in series with said secondary winding, said resonance capacitor adapted to have a voltage thereacross determined by resonance between said resonance capacitor and the leakage inductance of said transformer;

switching means connected in series with said primary winding and adapted to be coupled across a DC power source, said switching means selectively conducting or blocking current flow through said primary winding at a controllably variable frequency below the frequency of resonant voltage across said resonance capacitor when the series combination of said switching means and said primary winding is coupled across said DC power source;

a DC output filter;

control means coupled to said switching means for periodically turing on said switching means and for turning off said switching means when the current flowing in said switching means crosses zero, said control means being coupled to said DC output filter for regulating the output voltage of said converter in response to a commanded voltage by varying the frequency at which said switching means is turned on so as to conform said output voltage to said command voltage; and



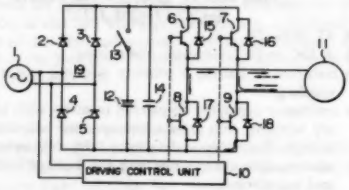
an uncontrolled rectifier connected across the combination of said secondary winding and said resonance capacitor, said uncontrolled rectifier oriented so as to be conductive when said resonance capacitor is charged by the magnetizing current of said transformer and to the nonconductive when said resonance capacitor discharges, said DC output filter including a filter inductor and a filter capacitor connected in series across said uncontrolled rectifier, the output of said converter being taken across said filter capacitor.

4,709,317

INVERTING APPARATUS

Kenichi Iizuka, Ashikaga; Tooru Kitayama; Hideo Uzuhashi, both of Tochigi, and Hideo Aoki, Machida, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 15, 1986, Ser. No. 907,008
Claims priority, application Japan, Sep. 20, 1985, 60-206458
Int. Cl.[4] H02M *5/45*
U.S. Cl. 363—37 **3 Claims**



1. An inverting apparatus comprising:

a full-wave rectifier;

a single-phase bridge inverter having semiconductor switches to which an output of said full-wave rectifier is applied;

a control unit for opening and closing said semiconductor switches;

a smoothing capacitor adapted to be connected to the output side of said full-wave rectifier; and

opening/closing means connected in series with said smoothing capacitor for enabling disconnection/connection of said smoothing capacitor to the output side of said full-wave rectifier,

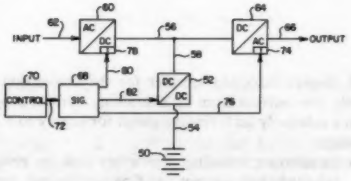
wherein said opening/closing means closes so that said smoothing capacitor is connected to the output side of said full-wave rectifier when said control unit opens and closes said semiconductor switches at a frequency different than a frequency of an input applied to said full-wave rectifier, and said opening/closing means opens so that said smoothing capacitor is disconnected from the output side of said full-wave rectifier when said control unit opens and closes said semiconductor switches at the same frequency as the frequency of the input applied to said full-wave rectifier.

4,709,318

UPS APPARATUS WITH CONTROL PROTOCOLS

Don A. Gephart, Delaware, and Jeffrey M. Powell, Galena, both of Ohio, assignors to Liebert Corporation, Columbus, Ohio

Filed Oct. 22, 1986, Ser. No. 922,022
Int. Cl.[4] H02M *5/45*
U.S. Cl. 363—37 **26 Claims**



1. Power supply apparatus employable with an a.c. source of given voltage and frequency characteristics for providing a regulated output to a load, comprising:

node means for receiving and conveying energy and exhibiting d.c. voltage levels;

input a.c.-to-d.c. converter means having an a.c. side connectable with said a.c. source and a d.c. side connected with said node means for effecting energy transmission from said a.c. source when enabled;

output d.c.-to-a.c. converter means having an a.c. side connectable with said load and a d.c. side connected with said node means for controllably deriving said related output when enabled;

battery means for providing a rechargeable storage reservoir and exhibiting given voltage levels;

d.c.-to-d.c. converter means coupled intermediate said node means and said battery means for controllably transferring energy from said battery means to said node means when enabled and for selectively effecting the charging of said battery means from said node means;

switch means for actuation between on and off conditions; and

control means including:

start-up control means responsive to said switch means actuation from said off to said condition, and further responsive to the to the presence of the first predetermined said given voltage level exhibited by said battery means, for deriving a start-up enabling for effecting said enablement of said d.c.-to-d.c. converter means to derive said node means d.c. voltage levels, and node monitoring circuit means responsive to said node means d.c. voltage levels for deriving a first mode voltage responsive signal when said node means d.c. voltage levels reach a predetermined start-up value, and

output control means responsive to said first node voltage

responsive signal and said start-up enabling signal for effecting said enablement of said output d.c.-to-a.c. converter means.

4,709,319

POWER SUPPLY DEVICE

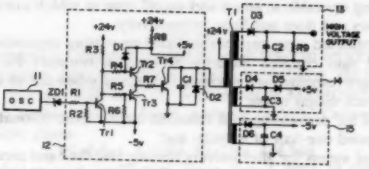
Kazuyoshi Takahashi, Kawasaki; Koji Suzuki; Joji Nagahira, both of Yokohama; Kunio Yoshihara, Tokyo; Toshiro Matsui, Kawasaki, and Tadashi Ishikawa, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 602,931, Apr. 23, 1984, abandoned. This application Sep. 15, 1986, Ser. No. 907,153

Claims priority, application Japan, Apr. 28, 1983, 58-73997

Int. Cl.[4] H02M *3/335*; H03K *3/33*

U.S. Cl. 363—49 **6 Claims**



1. A power supply device comprising:

signal generating means for generating a reference signal;

switching means for performing a switching operation in response to the reference signal;

a transformer driven by said switching means, said transformer having a first secondary winding for producing a high voltage and a second secondary winding for producing a rectified negative voltage; and

first power source means including a first rectifying means for driving said switching means, said first rectifying means being connected to the second secondary winding of said transformer and supplying a rectified negative voltage to said switching means in order that said switching means can rapidly perform a switching operation thereof;

wherein said switching means comprises a switching transistor having a base driven (i) by a primary power supply to said transformer, and (ii) by the rectified negative voltage outputted from said first rectifying means.

4,709,320

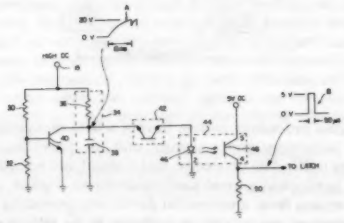
LOW VOLTAGE SHUTDOWN CIRCUIT

John G. Konopka, Ingleside, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Oct. 23, 1986, Ser. No. 922,373

Int. Cl.[4] H02H *7/122*

U.S. Cl. 363—56 **1 Claim**



1. In combination:

a switch mode power supply including a pulse width modulator for supplying a load circuit requiring a first DC voltage from a supply circuit developing a second, higher, DC voltage;

a voltage divider coupled across said supply circuit;

a transistor having its base coupled to said voltage divider, said voltage divider developing a bias voltage for said transistor;

an integrating circuit comprising a resistor and a series connected capacitor coupled across said supply circuit;

said resistor being connected as the load for said transistor and said transistor being operated in saturation to maintain the voltage across said capacitor at a low level in the presence of said second DC voltage;

a voltage sensitive switch connected to said capacitor;

a photo optic coupler coupled to said capacitor, said photo optic coupler including an LED diode connected in series with said voltage sensitive switch, and a photo transistor; and

said transistor being driven out of saturation responsive to decreases in said second DC voltage and permitting said capacitor to develop a charge, said voltage sensitive switch being driven conductive when the charge on said capacitor reaches a trigger level to operate said LED diode by discharge of said capacitor therethrough and thereby energize said photo transistor, the RC time constant of said integrating circuit being greater than the time required for said supply circuit to develop said second DC voltage after turn-on.

4,709,321

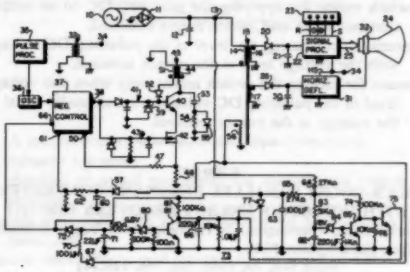
REGULATOR PROTECTION CIRCUIT FOR VIDEO APPARATUS

Dana C. Trantham, Indianapolis, Ind., assignor to RCA Corporation, Princeton, N.J.

Filed Oct. 31, 1986, Ser. No. 926,032

Int. Cl.[4] H02H *7/122*

U.S. Cl. 363—56 **5 Claims**



1. A power supply for a video apparatus comprising:

a source of unregulated voltage;

a transformer comprising:

a first winding coupled to said source of unregulated voltage for being energized therefrom;

a second winding electrically isolated from said first winding and disposed to being energized from said first winding for providing power to a load circuit; and

a third winding electrically nonisolated from said first winding and disposed for being energized from said first winding;

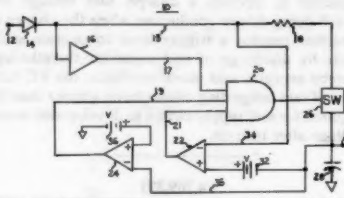
regulator means coupled to said third winding for receiving a first amount of power therefrom, said regulator means controlling the energization of said first winding when said regulator means operates in a normal mode of operation;

means for coupling said source of unregulated voltage to said regulator means for supplying a second amount of power thereto, the combination of said first and said sec-

ond amonts of power causing said regulator means to operate in said normal mode of operation, the operation of said regulator means in the absence of said first amount of power causing damage to said regulator means after a first time interval; and

protection means for disabling said regulator means after a second time interval less than said first time interval when said regulator means is operating in the absence of said first amount of power.

4,709,322
HIGH EFFICIENCY TRANSFORMERLESS AC/DC CONVERTER
Fred Mirow, 47 Edgewood Rd., Westwood, Mass. 02090
Filed Jul. 26, 1985, Ser. No. 759,147
Int. Cl.⁴ H02M *7/04*
U.S. Cl. 363—86 9 Claims



1. A high efficiency converter for obtaining a lower magnitude DC voltage from an AC voltage without magnetics comprising:

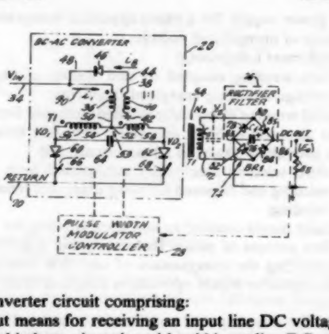
rectifier means for receiving the AC voltage and providing pulsating DC voltage,

switch means for applying the pulsating DC to an output terminal when said switch means is closed,

means for comparing the level of the pulsating DC voltage with the voltage level at the output terminal,

means for closing the switch means only when the voltage level of the pulsating DC voltage is substantially equal to the voltage at the output terminal.

4,709,323
BUCK-BOOST PARALLEL RESONANT CONVERTER WITH INDUCTIVE ENERGY RECOVERY CIRCUIT
Charles Lien, Huntington, N.Y., assignor to Venus Scientific Inc., Farmingdale, N.Y.
Filed Sep. 29, 1986, Ser. No. 913,141
Int. Cl.⁴ H02M *7/538, 3/337*
U.S. Cl. 363—97 10 Claims



1. A converter circuit comprising:

DC input means for receiving an input line DC voltage;

a coupled inductor in series with said input line DC voltage and recovery means in the coupled inductor for diverting energy from said coupled inductor to said DC input means;

an output transformer having a primary winding which includes first and second primary windings connected through a center tap of said output transformer and at least one secondary winding for developing a regulated alternating voltage output, said primary winding being connected to said coupled inductor at said center tap, a stray capacitance appearing across said secondary winding and being reflected across primary windings;

resonating capacitance located across said primary windings;

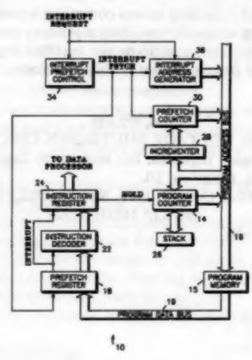
first and second switch means each having respective first and second current conducting terminals and a control terminal, said first and second conducting terminals being connected, respectively, in series circuit relationship to said first and second windings, each of said switch means being operable in an on and an off state in which current flows and does not flow, respectively;

said reflected stray capacitance, said resonating capacitance and said coupled inductor forming a resonant circuit which resonates at a resonant frequency when one of said switch means in on;

means for preventing said resonant circuit from resonating beyond one-half of a cycle; and

control means for alternatively turning said first and second switch means on through their respective control terminal at a control frequency which is less than said resonant frequency, to generate said regulated alternating voltage at said secondary winding, said control means causing only one of said switch means to be on at any time.

4,709,324
DATA PROCESSOR CONTROL UNIT HAVING AN INTERRUPT SERVICE USING INSTRUCTION PREFETCH REDIRECTION
Kevin L. Kloker, Arlington Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Filed Nov. 27, 1985, Ser. No. 802,491
Int. Cl.⁴ G06F *15/06*
U.S. Cl. 364—200 6 Claims



1. In a data processing system having a data processor for executing intructions and a control unit for providing said instructions to the data processor, said control unit selectively providing prefetched normal instructions in an absence of an interrupt request from a peripheral device and providing prefetched interrupt instructions in response to an interrupt request, a method for minimizing instruction cycles in which no instructions are being executed by the data processor associated with interrupting instruction flow to execute an interrupt service routine in response to an interrupt request, comprising the steps of:

detecting receipt of a request from the peripheral device to interrupt normal instruction flow from the control unit to the data processor;

providing a control signal for a duration of at least one instruction cycle in response to the request to interrupt normal instruction flow;

redirecting normal instruction prefetches for the at least one instruction cycle in response to the control signal to provide at least one interrupt instruction prefetch, said at least one interrupt instruction prefetch being initiated before said prefetched normal instructions complete execution;

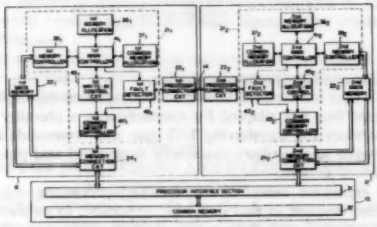
redirecting said at least one interrupt instruction prefetch immediately after the at least one instruction cycle duration of the control signal to continue providing normal instruction prefetches, said normal instruction prefetches being initiated before said at least one prefetched interrupt instruction completes execution.

4,709,325

LOOSELY COUPLED MULTIPROCESSOR SYSTEM CAPABLE OF TRANSFERRING A CONTROL SIGNAL SET BY THE USE OF A COMMON MEMORY

Seiichi Yajima, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 4, 1984, Ser. No. 646,966
Claims priority, application Japan, Sep. 2, 1983, 58-160522
Int. Cl.[4] G06F *15/16*
U.S. Cl. 364—200 **2 Claims**



1. A multiprocessor system including first and second processor units which are loosely coupled to each other and which comprise first and second main memories, respectively, each processor unit carrying out a processing operation and producing a fault signal when said processing operation falls into disorder, said fault signal being received by a normal one of said first and said second processor units that does not produce said fault signal and being for making said normal one of the first and the second processing units take over the processing operation falling into disorder, said first and said second main memories comprising:

first and second program areas for storing first and second programs executed in said first and said second processor units, first and second control signal areas for storing first and second sets of control signals which are used as primary control signals in said first and said second processor units and each of which is renewed with time, and first and second additional control signal areas for storing said second and said first sets of the control signals, respectively;

said multiprocessor system further comprising:

a common memory having first and second memory areas assigned to said first and said second processor units, respectively;

said first and said second processor units comprising:

write-in means for writing said first and said second sets of the control signals in said first and said second memory areas whenever said first and said second sets of the control signals are renewed in said first and said second main memories, respectively;

each of said first and said second processor units comprising:

access means responsive to said fault signal for accessing a particular one of said first and said second memory areas to read the control signal set written therein, said particular one of the first and the second memory areas being assigned to the processor unit producing said fault signal; and

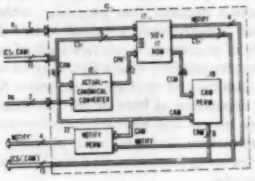
operation means for carrying out the processing operation with reference to the control signal set read out of said particular one of the first and the second memory areas in addition to each of said primary control signals.

4,709,326

GENERAL LOCKING/SYNCHRONIZATION FACILITY WITH CANONICAL STATES AND MAPPING OF PROCESSORS

John T. Robinson, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 29, 1984, Ser. No. 626,163
Int. Cl.[4] G06F *13/14*
U.S. Cl. 364—200 **8 Claims**



1. A multiprocessor system, of the type comprising:

a common resource;

a plurality of actual processors for sharing said common resource;

means associated with each processor for generating a request; and

means responsive to said requests for maintaining a lock for controlling access by said plurality of actual processors to said common resource, said lock having a plurality of possible actual lock states corresponding to respective relationships between said plurality of actual processors, said lock means including transition table means for storing lock state transition information including a plurality of first canonical lock states and requests and a second lock canonical state which will result for a given combination of first canonical lock state and request, said first and second canonical lock states corresponding to respective relationships between canonical processors, whereby each canonical lock state represents a plurality of different actual lock states, said transition table means including actual-canonical conversion means for receiving a processor identification code designating the source of a received request and for converting said processor identification code in accordance with the mapping of canonical processors to actual processors in order to obtain a canonical processor identification code CPk', said system further comprising mapping means for mapping canonical processors in said transition table to actual processors.

4,709,327

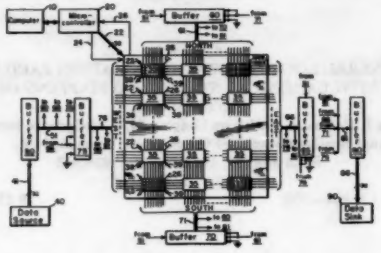
PARALLEL PROCESSOR/MEMORY CIRCUIT

W. Daniel Hillis, 111 Ivy St., Brookline, Mass. 02146; Thomas F. Knight, Jr., 58 Douglas Rd., Belmont, Mass. 02178; Alan Bawden, 93 Jackson St., Cambridge, Mass. 02140; Brewster L. Kahle, 59 Munroe St., Somerville, Mass. 02143; David Chapman, 343 Broadway; David P. Christman, 390 Broadway, both of Cambridge, Mass. 02139; Cliff A. Lasser, 155 Bay State Rd., Boston, Mass. 02215, and Carl R. Feynman, 17 Creighton St., Cambridge, Mass. 02146

Filed May 31, 1983, Ser. No. 499,471

Int. Cl.[4] G06F *15/16*

U.S. Cl. 364—200 **8 Claims**



1. An array of processor/memories comprising:

an instruction decoder that generates tables of outputs in response to instructions received at said decoder,

a plurality of processor/memories each of which comprises a memory means into which data may be written and from which data may be read and a processor for producing an output depending at least in part on data read from said memory means and instruction information received at said instruction decoder, said plurality of processor/memories being fabricated on a single chip of semiconductive material,

means for simultaneously addressing at least one cell in each of said memory means either to write data thereto or read data therefrom,

means for providing as an input to each processor the data read from its associated memory means,

means for providing to each said processor the output tables from said decoder, said output tables specifying all possible outputs for the different combinations of inputs to said processor, and

means in each said processor for selecting as the output from said processor that output in the output table that corresponds to the data input to the processor.

4,709,328

COMPOSITE DATA-PROCESSING SYSTEM USING MULTIPLE STANDALONE PROCESSING SYSTEMS

Bruce O. Anthony, Jr.; Glenn D. Batalden, both of Rochester; Glen R. Mitchell, Pine Island; Phillip C. Schloss, and David K. Wells, both of Rochester, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 17, 1985, Ser. No. 745,546

Int. Cl.[4] G06F *15/16*

U.S. Cl. 364—200 **11 Claims**

1. A composite data-processing system, comprising

(a) a host-processing system capable of executing host application programs independently of any other processing system, including

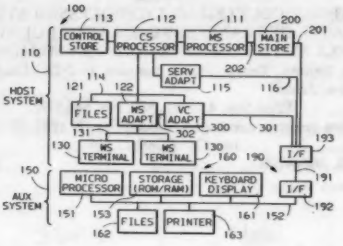
(1) a host-processing engine, comprising means for executing host application programs and for storing and retrieving emulation data and commands, and means for generating virtual channel activation signals.

(2) a dual-port memory having first and second ports, said first port being accessible by said host-processing engine, for storing and retrieving emulation data and commands,

(3) a channel bus coupled to said host-processing engine, said channel bus adapted by connection to a plurality of I/O hardware adapters for transferring I/O data and commands between said host-processing engine and a plurality of input/output means controlled by said I/O hardware adapters,

(4) at least one virtual channel adapter connected to said channel bus, said at least one virtual channel adapter having means for receiving virtual channel activation signals from said host processing engine, and having means for receiving and producing control signals in response thereto, for at least a first type of input/output means;

(b) an auxiliary-processing system capable of executing auxiliary application programs independently of any other processing system, including



(1) an auxiliary-processing engine,

(2) a data bus coupled to said auxiliary-processing engine, said data bus adapted for connection to a plurality of devices for transferring I/O data and commands between said auxiliary-processing engine and said plurality of devices,

(3) emulation means in said auxiliary-processing engine and coupled to said data bus, responsive to emulation control signals for causing said auxiliary-processing system to emulate said first type of input/output means;

(c) interconnection means for coupling said second port of said dual-port memory to said data bus, and for coupling said virtual channel adapter to said data bus;

whereby said virtual channel adapter may initiate emulation control signals to cause said auxiliary-processing system to emulate said first type of input/output means in said host-processing system.

4,709,329

INPUT/OUTPUT DEVICE CONTROLLER FOR A DATA PROCESSING SYSTEM

Mark B. Hecker, Northborough, Mass., assignor to Data General Corporation, Westboro, Mass.

Filed Jun. 25, 1984, Ser. No. 624,062

Int. Cl.[4] G06F *13/12*

U.S. Cl. 364—200 **5 Claims**

1. In a data processing system having a central processing unit, an input/output bus connected to said central processing unit, a memory bus connected to said central processing unit, a CRT display for displaying information and a video control section, said video control section controlling the operation of said CRT display and being connected to said memory bus and to said CRT display, an input/output controller for interfacing said data processing system to input/output devices, said input-/output controller including:

a. a terminal control section,

b. an input/output control section,

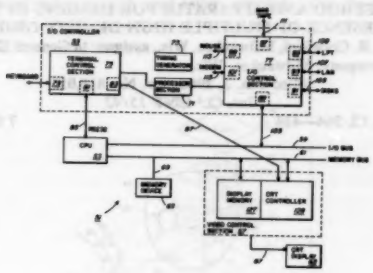
c. a timing clock generator section, and

d. a processor section,

e. said terminal control section being connected to said central processing unit, to said video control section and to said processor section and including interface means for interfacing to a keyboard,

f. said input/output control section being connected to said processor section and to said input/output bus and including:

i. peripheral device controller means for connecting said input/output control section to at least one input/output device, and



ii. a data channel controller for interfacing said input/output control section to said input/output bus,

g. said processor section managing the operations of said terminal control section and said input/output control section, and

h. said timing clock generator section being connected to said processor section and generating clock signals for said processor section.

4,709,330

SYSTEM FOR SUPERVISING AND GUIDING PERSONS IN CONSTRUCTION

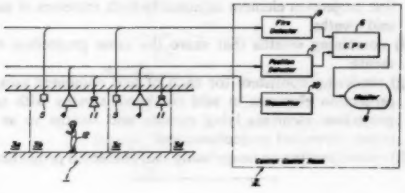
Shigeo Yokoi, Kitasoma; Takashi Isozaki, Komaki; Ryuta Yamamoto, Yokohama, and Toshiyuki Kawaguchi, Inuyama, all of Japan, assignors to NGK Insulators Ltd., Nagoya, Japan

Filed Oct. 4, 1984, Ser. No. 657,532

Claims priority, application Japan, Oct. 7, 1983, 58-188932

Int. Cl.[4] G06F *15/20*; G06G *7/48*

U.S. Cl. 364—400 **20 Claims**



1. A system for supervising and guiding persons in a construction divided into a plurality of sections comprising:

identifying means provided in each respective section for receiving radiation emitted from one or more persons located in one or more respective sections, each identifying means producing a signal representing the presence of one or more persons in a respective section, and supplying the signal to a central control room in such a way that the central control room can identify said respective section;

means arranged in the central control room for receiving signals supplied from identifying means in respective sections in which one or more persons are situated;

means provided in the central control room for displaying the detected position of said respective sections in which one or more persons are situated;

means provided in the central control room for sending information to persons in said respective sections in which one or more persons are situated;

means provided in each respective section for detecting an abnormal condition occuring in respective sections and producing a signal, and means provided in the central control room for responding to said detection signal;

means provided in the central control room for generating information adequate for emergency escape on the basis of the detected positions of persons and the positions of sections in which the abnormal condition has been detected, and means for displaying the information together with the detected positions of persons; and

means provided in each respective section for displaying said information adequate for emergency escape.

4,709,331

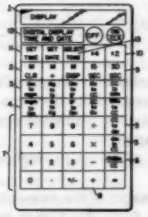
CALCULATOR-COMPUTER FOR CALCULATING INFUSION RATES OVER VARYING TIME INTERVALS

Patricia A. Barkett, 5420 SW. 163rd Ave., Fort Lauderdale, Fla. 33331, and Michael G. Clapp, 5678 NW. 195th Terr., Opa-Locka, Fla. 33055

Filed May 1, 1984, Ser. No. 605,808

Int. Cl.[4] G06F *15/42*

U.S. Cl. 364—413 **6 Claims**



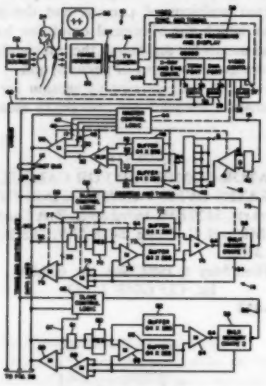
5. A calculator-computer comprised of a keyboard having numerical value keys, zero through nine; mathematical function keys for performing addition, substraction, multiplication and division; also equal and decimal keys; an on and clear switch; a power source; an off switch and display and memory registers combined with a conversion program, keys controlling access to the program to convert grams to milligrams, kilograms to pounds, grams to grains, ounces to cubic centimeters, cubic centimeters to drops, milligrams to grams, pounds to kilograms, grains to grams, cubic centimeters to ounces, drops to cubic centimeters, cubic centimeters to drams, drams to cubic centimeters and fifteen drops to cubic centimeters, circuit means connecting said keys and display whereby using said keys causes activation of the selected circuit to produce the sought after result directly on the display register without the display of intermediate determinants, and means whereby an infusion rate may be determined by entering a rate for one volume of fluid per a selected time element said means will directly produce on the display register the rate of a different volume of fluid for a different preselected time element, time interval keys indicating time intervals of 15 seconds and 30 seconds, a timing device, and circuitry connecting said time interval keys to said timing device and other conversion keys, x4 and x2, representing multiplication by four and by two respectively circuitry connecting said other conversion keys with said numerical value keys to convert a numerical value entered to a value that equals two or four times said numerical value whereby when a medical professional has determined a pulse rate for a selected portion of a minute, 15 or 30 seconds, entry of the rate and x4 or x2 key automatically displays the pulse rate per minute.

4,709,332

HIGH SPEED IMAGE DATA PROCESSING

John Morrison, Dix Hills; Eric J. Siskind, Lattingtown, both of N.Y., and Meryll M. Frost, Jr., Baltimore, Md., assignors to North Shore University Hospital, Manhasset, N.Y.

Filed Oct. 5, 1984, Ser. No. 659,071
Int. Cl.[4] G06F *15/28, 15/44;* G06G *7/48*
U.S. Cl. 364—414 17 Claims
MICROFICHE APPENDIX INCLUDED
(358 Microfiche, 8 Pages)



1. A method for obtaining images of anatomical vasculature of a living patient comprising the steps of:

intravenously injecting a suitable contrast medium into the body of the patient;

directing a beam of X-rays through a region of the patient's body;

deriving video images of the vasculature of the region of the patient's body from the X-rays transmitted through the region at a rate sufficient to avoid significant blurring of the video images caused by the motion of tissue and bone in the region;

generating digital image data corresponding to the video images at substantially the rate at which the video images are derived;

storing the digital image data in a bulk memory, including transferring the digital image data over a bus to the bulk memory at least at the rate at which the digital image data are generated, said transferring to the bulk memory including:

assembling the digital image data into first data blocks of a first predetermined size;

providing first block transfer control signals under a predetermined block transfer protocol;

generating first data transfer words from the first data blocks in response to the first control signals;

receiving the first data transfer words in response to the first control signals; and

deriving the digital image data from the first data transfer words and storing the digital image data in the bulk memory; and

processing the digital image data to enhance the video images for subsequent viewing, including transferring the digital image as required for such processing from the bulk memory over the bus when the bus is not being used for transferring digital image data to the bulk memory, said transferring from the bulk memory including:

generating second block transfer control signals under the predetermined block transfer protocol;

reading the digital image data from the bulk memory in response to the second block transfer control signals;

assembling the digital image data into second data blocks having a second predetermined size;

generating second data transfer words from the second data blocks in response to the second block transfer control signals;

receiving the second data transfer words in response to the second control signals; and

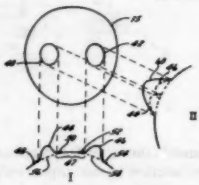
deriving the digital image data from the second data transfer words.

4,709,333

METHOD AND APPARATUS FOR IMAGING IN THE PRESENCE OF MULTIPLE HIGH DENSITY OBJECTS

Carl R. Crawford, Milwaukee, Wis., assignor to General Electric Company, Milwaukee, Wis.

Filed Jan. 3, 1986, Ser. No. 816,013
Int. Cl.[4] G06F *15/42*
U.S. Cl. 364—414 7 Claims



1. A method for removing a plurality of high-density objects from a CT image comprising the steps of:

(a) exposing a body having a plurality of high-density objects located therein to penetrating radiation at a pluarality of angles about the body;

(b) detecting radiation passing through said body at a plurality of angles to create a projection set made up of a plurality of projections, each projection being made up of a plurality of elements;

(c) reconstructing an initial image from said plurality of projections;

(d) defining in said initial image regions encompassing said high-density objects to be removed for each projection;

(e) marking projection elements corresponding to radiation paths through said defined regions forming a plurality of swaths of marked projection elements, including a baseline projection element adjacent to both extremes of each said swaths;

(f) combining swaths that share the same projection elements;

(g) rendering consistent for each of said combined swaths projection elements in said combined swaths with said projection elements lying outside said swaths so as to create corrected projections; and

(h) reconstructing an image using said corrected projections.

4,709,334

METHOD FOR CONTROLLING THE SUPPLY OF FUEL FOR AN INTERNAL COMBUSTION ENGINE

Yoshiharu Abe, Tochigi; Yoshio Wazaki, and Tetsuya Oono, both of Utsunomiya, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan

Filed Sep. 27, 1985, Ser. No. 781,053
Claims priority, application Japan, Sep. 28, 1984, 59-203274
Int. Cl.[4] F02D *5/02;* F02M *51/00*
U.S. Cl. 364—431.05 6 Claims

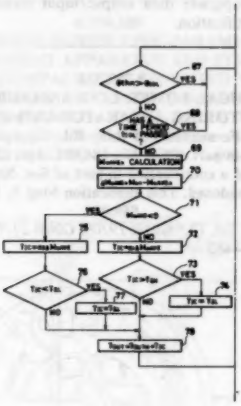
1. A method for controlling fuel supply of an internal combustion engine, according to a pressure within an intake pipe downstream of a throttle valve and an engine rotational speed, comprising steps of:

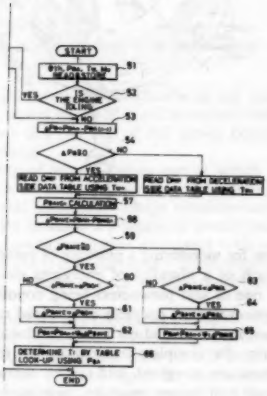
detecting an instant at which an angular position of a crankshaft of the engine becomes equal to a predetermined angular position, repeatedly;

sampling said pressure within the intake pipe downstream of the throttle valve and an engine rotational speed each time of detection of said instant;

detecting whether the engine is operating within an idling range using a latest sampled value P_{BAn} of said pressure within the intake pipe and a latest sampled value M_{en} of said engine rotational speed;

setting a target value P_{BAVEn} having a predetermined functional relation with said latest sampled value P_{BAn} of





pressure within the intake pipe and a preceding target value $P_{BAVE(n-1)}$ determining a first fuel supply amount according to said target value P_{BAVEn} when the engine is detected to be operating outside of said idling range, and during a predetermined time period from a time when the engine is detected firstly to be operating within said idling range;

setting a target value M_{eAVEn} having a predetermined functional relation with said latest sampled value M_{en} of the engine rotational speed and a preceding target value $M_{eAVE(n-1)}$, and determining a second fuel supply amount according to said target value M_{eAVEn} when the engine is detected to be operating within said idling range for more than the predetermined time period; and

supplying fuel to the engine according to one of said first and second fuel supply amounts which are determined alternatively.

4,709,335

ELECTRONIC GOVERNOR FOR INTERNAL COMBUSTION ENGINES

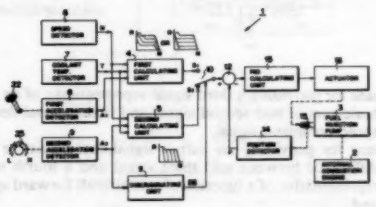
Kenji Okamoto, Higashimatsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Japan

Filed Mar. 13, 1985, Ser. No. 711,240

Claims priority, application Japan, Mar. 12, 1984, 59-45651

Int. Cl.[4] F02M *39/00*

U.S. Cl. 364—431.05 **10 Claims**



1. An electronic governor for electronically controlling the speed of an internal combustion engine which is equipped on a vehicle and is selectively used to power the vehicle or a machine associated with the vehicle, the operation of the vehicle being controlled by an accelerator pedal and the operation of the machine being controlled by operation of a speed setting member, said electronic governor comprising:

means for producing a first signal relating to the amount of depression of the accelerator pedal;

means for producing a second signal relating to the amount of operation of said speed setting member;

a discriminating means for discriminating the level of the second signal;

a producing means responsive to the discrimination by said discrimination means for calculating and outputting a first control signal for controlling the amount of fuel injected in accordance with a first governor characteristic on the basis of the first signal when said discriminated level indicates a non-operation condition of said speed setting member for said machine, or a second control signal for controlling the amount of fuel injected in accordance with a second governor characteristic on the basis of the second signal when said discriminated level indicates an operation condition of said speed setting member for said machine; and

actuating means responsive to the output of the producing means for operating a fuel regulating member for the internal combustion engine.

4,709,336

DESCENT FLIGHT PATH CONTROL FOR AIRCRAFT

Terry L. Zweifel, Phoenix, Ariz., assignor to Sperry Corporation, New York, N.Y.

Filed Jan. 9, 1985, Ser. No. 689,760

Int. Cl.[4] G05D *1/06*; B64C *13/18*

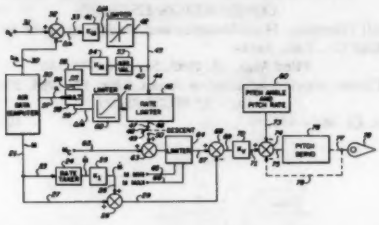
U.S. Cl. 364—433 **9 Claims**

1. Descent control apparatus for an aircraft flight control system including servo means for controlling aircraft pitch attitude to increase or decrease the nominal descent speed and capture a computed flight path and means for providing signals representative of desired descent path altitude, actual altitude, aircraft forward speed, speed of sound, and a commanded

nominal descent speed, said descent control apparatus comprising:

means for providing a first signal representative of a difference between said aircraft actual altitude and said desired descent path altitude,

means for multiplying said first signal by a predetermined value to provide a second signal representative of an incremental speed command,



means for providing a third signal representative of an algebraic sum of said second signal and said nominal descent speed command signal,

means for providing an output signal representative of a difference between said third signal and a fourth signal representative of a function of said aircraft forward speed, and

means for applying said output signal to said servo means thereby to increase or decrease said nominal descent speed in accordance therewith.

4,709,337

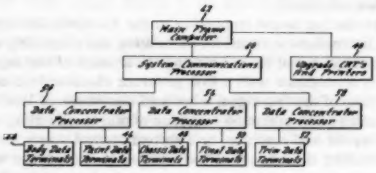
VEHICLE ASSEMBLY METHOD

George P. Knapp, Washington; Bobby W. Higgins, Fraser, and Durward W. Roller, Romeo, all of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Feb. 6, 1986, Ser. No. 826,647

Int. Cl.[4] G06F *15/46*

U.S. Cl. 364—468 **3 Claims**



1. A method of quality assurance and rectification of defects in the process of assembling a vehicle on a continuously moving assembly line comprising the steps of:

a. providing a continuously moving assembly line for assembly of vehicles;

b. providing assembly stations along the length of the continuously moving assembly line attended by operators who perform discrete assigned tasks on incomplete vehicles positioned on the continuously moving assembly line as the incomplete vehicles pass by, leading to building of complete vehicles;

c. providing an assembly data input terminal at each assembly station, with each data input terminal having a plurality of manually actuatable switches corresponding to a discrete assigned tasks of an operator;

d. the operators manipulating the switches to indicate successful or unsuccessful completion of discrete assigned tasks with respect to specific incomplete vehicles;

e. communicating the input data from the assembly data input terminals to a central computer;

f. providing upgrade stations attended by operators at spaced locations between groups of assembly stations along the length of the continuously moving assembly line;

g. providing upgrade data output/input terminals at the upgrade stations which communicate with the central computer;

h. the operators at the upgrade stations receiving information at the upgrade data output/input terminals from the central computer with respect to specific incomplete vehicles concerning preceding unsuccessful task completion and rectifying preceding unsuccessfully completed tasks as the incomplete vehicles pass by; and

i. communicating information back to the central computer via the upgrade data output/input terminals regarding such rectification.

4,709,338

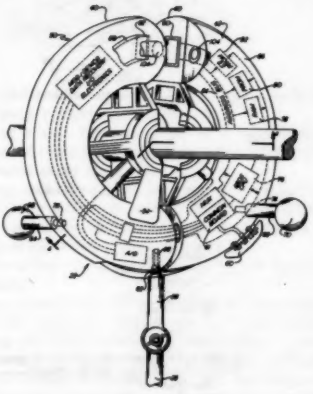
ELECTRICAL POWER LINE AND SUBSTATION MONITORING APPARATUS AND SYSTEMS

Roosevelt A. Fernandes, 104 Ruby Rd., Liverpool, N.Y. 13088

Continuation-in-part of Ser. No. 484,681, Apr. 13, 1983, Pat. No. 4,689,752, and a continuation-in-part of Ser. No. 795,226, Nov. 5, 1985, abandoned. This application May 5, 1986, Ser. No. 859,496

Int. Cl.[4] G01R *19/00*; G08B *21/00*

U.S. Cl. 364—483 **40 Claims**



1. A system for monitoring a plurality of parameters associated with each of a plurality of energized electrical power conductors, one of said parameters being conductor voltage, on power system circuits operable over a load range between predetermined minimum and maximum conductor currents in either direction for complete installation and removal while said conductors are energized, said system comprising:

(a) a plurality of sensor modules each having a metallic housing, one of said modules being mounted upon each of said energized conductors, said housing being conductively isolated from said conductor at least for frequencies below the highest frequency of conductor voltage to be measured, whereby the surface of said housing continuously collects the charging current due to the electrostatic field associated with said conductor;

(b) means connected between said conductor and said housing for measurement of conductor voltage from said charging current;

(c) means contained within said housing for continuously sensing the current through said conductor over said entire load range;

(d) means carried by each of said modules for establishing

the phase relationship between said sensed values of conductor voltage and conductor current;

(e) means carried by each of said modules for identifying, processing and storing said sensed values of conductor voltage and conductor current and said established phase relationship;

(f) means carried by each of said modules for transmitting a sequence of encoded signals commensurate with each of said sensed values and including said established phase relationship and sensor module identification; and

(g) means remote from said modules for receiving said signals from each of said plurality of sensor modules, decoding said signals and calculating voltage, current and power factor of each of said conductors.

4,709,339

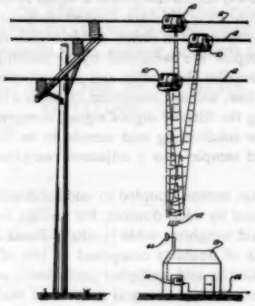
ELECTRICAL POWER LINE PARAMETER MEASUREMENT APPARATUS AND SYSTEMS, INCLUDING COMPACT, LINE-MOUNTED MODULES

Roosevelt A. Fernandes, 104 Ruby Rd., Liverpool, N.Y. 13088

Continuation-in-part of Ser. No. 484,681, Apr. 13, 1983, Pat. No. 4,689,752. This application May 5, 1986, Ser. No. 859,497

Int. Cl.[4] G01R *19/00*; **G08B** *21/00*

U.S. Cl. 364—492 **29 Claims**



1. A compact system for installation on and removal from energized AC power conductors and accurately measuring the voltage on each of a plurality of AC power conductors, said system comprising:

(a) a plurality of sensing means one of which is mounted upon each of said conductors and including means to measure said conductor voltage simultaneously by all of said sensing means at a plurality of predetermined times;

(b) signal transmitting means associated with each of said sensing means to transmit signals commensurate with said conductor voltage at each of said predetermined times; and

(c) signal receiving and processing means for receiving said transmitted signals and calculating therefrom the tue value of said voltage on each of said conductors after correcting the received signal for any influence of adjacent conductor on said measured voltage.

4,709,340

DIGITAL SPEECH SYNTHESIZER

Giuseppe N. Capizzi, Brandizzo; Cesario Cianci, Pianezza, and Marcello Melgara, Valenza, all of Italy, assignors to CSELT—Centro Studi e Laboratori Telecomunicazioni S.p.A., Turin, Italy

Filed Jun. 11, 1984, Ser. No. 619,029

Claims priority, application Italy, Jun. 10, 1983, 67642 A/83

Int. Cl.[4] G10L *5/00*

U.S. Cl. 364—513.5 **15 Claims**

1. A digital speech synthesizer connected via a bidirectional external bus to an outside source of data words utilizable in the generation of digital speech samples, said synthesizer comprising:

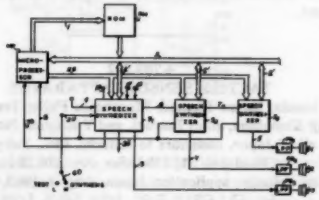
a bidirectional internal bus;

first memory means loadable from said outside source by way of said external bus with data words constituting parameters relating to frequency distribution, volume and duration of speech elements, said first memory means having output connections to said internal bus;

first counting means provided with loading connections to said internal bus for controlling writing and reading of said first memory means, said first counting means being presettable by data words read out from said first memory means for the establishment of variable operating intervals therefor;

second memory means storing waveform samples readable onto said internal bus under the control of said first counting means;

an operating memory connected to said internal bus for receiving additional parameters read out from said first memory means;



a synthesis filter with two-way connections to said internal bus for processing waveform samples read out from said second memory means and additional parameters stored in said operating memory to generate outgoing digital speech samples;

output means connected to said internal bus for emitting the outgoing speech signals generated by said synthesis filter;

third memory means storing two sets of instructions respectively enabling normal operation of said synthesis filter in response to data words loaded into said first memory means and execution of a checking procedure based on test words emitted by said outside source on said external bus;

switchover means responsive to an external selection signal for choosing between said two sets of instructions; and

second counting means controlled by said switchover means for addressing said third memory means.

4,709,341

SELF-MONITORING SYSTEM FOR DETECTING ERROR AT OUTPUT PORT DURING COLD START OF MICROPROCESSOR SYSTEM

Toshiro Matsuda, Sagamihara, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Nov. 9, 1984, Ser. No. 670,011

Claims priority, application Japan, Nov. 14, 1983, 58-212537

Int. Cl.[4] G06F *11/22, 15/50*

U.S. Cl. 364—550 **14 Claims**

1. A self-monitor system for a microprocessor system comprising:

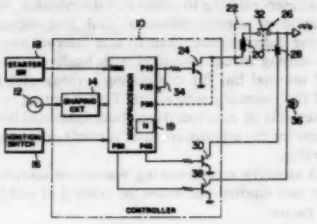
a specific output port incorporated in said microprocessor system and connected to a load to be controlled by an output of the microprocessor;

a check port electrically connected to said specific output port;

first means, associated with said specific output port and responsive to a specific operational condition of the microprocessor to output a unique value through said specific output port; and

second means for detecting electrical conditions at said check port and producing an alarm signal when electrical

conditions at said check port do not indicate output of said unique value through said specific output port within a



predetermined allowable time lag after said first means first outputs said unique value through said specific output port.

4,709,342

TACTILE SENSING APPARATUS

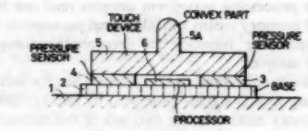
Yuji Hosoda; Kazuo Honma; Masakatsu Fujie; Taro Iwamoto; Kohji Kamejima, all of Ibaraki, and Yoshiyuki Nakano, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

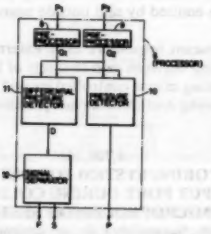
Filed Jul. 31, 1984, Ser. No. 636,296

Claims priority, application Japan, Aug. 3, 1983, 58-141030

Int. Cl.[4] G01D *7/02, 5/14;* **G01L** *5/16*

U.S. Cl. 364—558 **12 Claims**





1. A tactile sensing apparatus for detecting a tactile sense with an object to-be-handled comprising a base, detection means including a plurlaity of pressure sensing devices arranged on said base, and a touch device having a member including a convex part mounted at a central portion thereof for distributing and applying a force to said plurality of pressure sensing devices, and processor means connected to said plurality of pressure sensing devices for processing outputs of said plurality of pressure sensing devices, said detection means and said processor means being arranged on the same base, and a protective layer made of a flexible material being formed around said detection means, wherein said processor means forms information based on an average value of outputs of said plurality of pressure sensing devices and in a D.C. component and an A.C. component of a difference of outputs of said plurality of pressure sensing devices.

4,709,343

VARIABLE-PASSBAND VARIABLE-PHASE DIGITAL FILTER

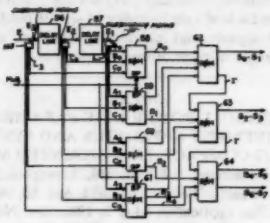
Luc P. Van Cang, Savigny sur Orge, France, assignor to Thomson CSF, Paris, France

Filed Dec. 28, 1984, Ser. No. 687,464

Claims priority, application France, Dec. 30, 1983, 83 21102

Int. Cl.[4] G06F *15/31*

U.S. Cl. 364—724 **11 Claims**



1. A variable-passband variable-phase digital filter of the type in which Q digital samples of a signal to be filtered, which are coded on $2 \times q$ bits, are applied successively to $(Q-1)$ delay lines connected in series, and in which the values of the delayed samples are weighted by Q multiplier coefficients which are smaller than unity and are collected at outputs of each delay line, and are combined, to form a series of samples representing the filtered digital signal, comprising:

means for subdividing said sample to be filtered and each delayed sample into q adjacent, weighted two-bit doublets;

first storage means, coupled to said subdividing means to be addressed by each doublet, for storing weighting tables, each said weighting table results of linear combinations of weights of doublets composed of bits of the same rank multiplied by said multiplier coefficients, and producing at the same time an integral portion of said results in said weighting tables and fractional portions thereof;

second storage means having a plurality of addressing inputs receiving at the same time the integral and fractional portions thereof, and for ensuring that each binary number addressed in the second storage means by said integral and fractional portions of the results from said first storage means as a function of the values of the Q samples of the signal to be filtered, has a value equal to a linear combination of corresponding values of the Q samples of the signal by the Q multiplier coefficients.

4,709,344

PROGRAMMABLE MULTIFREQUENCY DIGITAL TONE RECEIVER

Robert J. Crawford, Elgin, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 2, 1985, Ser. No. 782,786

Int. Cl.[4] G06F *7/38, 15/31*

U.S. Cl. 364—724 **25 Claims**

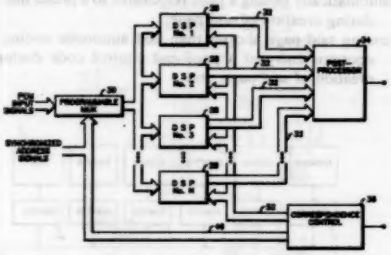
1. A circuit arrangement for filtering input signals in a multichannel pulse code modulation (PCM) system, comprising:

(a) a plurality of digital signal processing means, each of said digital signal processing means responsive means to a start signal for receiving an input signal and each providing an output signal upon completion of one or more filtering operations;

(b) means for multiplexing the input signals to each of said digital signal processing means, thereby establishing a distribution of the PCM channels to said filtering operations in each of said digital signal processing means;

(c) means for analyzing frequency characteristics of said

output signals from each of said plurality of digital signal processing means; and



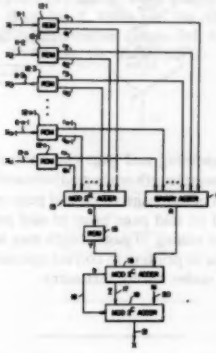
(d) control means for selectively controlling said distribution of the PCM channels to said filtering operations of said digital signal processing means.

4,709,345

APPARATUS FOR EXECUTING CHINESE REMAINDER THEOREM FOR RESIDUE DECODING THROUGH QUOTIENT-REMAINDER CONVERSION

Thu V. Vu, Indialantic, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed Apr. 4, 1985, Ser. No. 719,915
Int. Cl.[4] G06F *7/38*
U.S. Cl. 364—746 **13 Claims**



1. An apparatus for processing data representative signals in accordance with the Chinese remainder theorem, including an arrangement for converting a plurality of n residue representative signals $x_1, x_2, \ldots, x_n$ to an output signal X, said an arrangement comprising:

first means, coupled to receive said plurality of n residue representative signals $x_1, x_2, \ldots, x_n$, for producing therefrom a first plurality of signals $q_1, q_2, \ldots, q_n$ respectively representative of quotients of prescribed functions of said residue representative signals with respect to a prescribed divisor and a second plurality of signals $r_1, r_2, \ldots, r_n$ respectively representative of remainders of said prescribed functions of said residue representative signals with respect to said prescribed divisor;

second means, coupled to said first means, for producing a quotient sum signal Q representative of the sum of said first plurality of signals in accordance with a prescribed signal format and for producing a remainder sum signal R representative of the sum of said second plurality of signals in accordance with said prescribed signal format; and

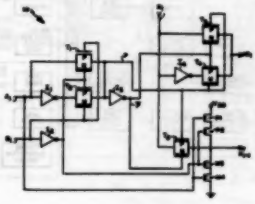
third means, coupled to said second means, for combining said quotient sum signal Q and said remainder sum signal R to produce said output signal X.

4,709,346

CMOS SUBTRACTOR

Dennis A. Henlin, Dracut, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Apr. 1, 1985, Ser. No. 718,412
Int. Cl.[4] G06F *7/42, 7/50*; H03K *19/21, 19/20*
U.S. Cl. 364—784 **1 Claim**



1. In a digital computer wherein the difference between two N-bit binary numbers is to be calculated, N stages of cascaded binary adders to effect subtraction by utilizing two's complement arithmetic, starting from the least significant bits in the two N-bit binary numbers, each one of the N stages being fabricated in CMOS circuitry to accept corresponding bits A_i, B_i, and a borrow-in signal, X_i, and to produce a difference signal, D_i, and a carry-out signal, X_{i+1}, each one of the N stages comprising:

(a) a first and a second inverter, responsive respectivey to the A_i and B_i bits to product $\overline{A}_i$ and $\overline{B}_i$ signals;

(b) a first transmission gate conditioned to pass the A_i bit when the B_i bit is at a logic zero level and the $\overline{B}_i$ signal is at a logic one level;

(c) a second transmission gate conditioned to pass the $\overline{A}_i$ signal when the B_i bit is at a logic one level and the $\overline{B}_i$ signal is at a logic zero level;

(d) OR gate means, responsive to the outputs of the first and the second transmission gates, for producing a signal P corresponding to the one of the first and second transmission gates conditioned to pass a signal;

(e) a third inverter, responsibe to the signal P, for producing a signal $\overline{P}$;

(f) a fourth inverter, responsibe to the borrow-in bit X_i for producing a signal $\overline{X}_i$;

(g) third and fourth transmission gates, conditioned by the signal P and to the signal $\overline{P}$ to pass either the borrow-in bit X_i or the signal X_i; and

(h) borrow-out generating means, responsive to the carry-in signal, X_i, the P signal, the $\overline{P}$ signal, the bit A_i and the output B_i of the second inverter, to produce a borrow-out signal described by the Boolean expression, $[(\overline{A}_i+\overline{B}_i)X_i+\overline{A}_iB_i]$, the borrow-out generating means consisting of:

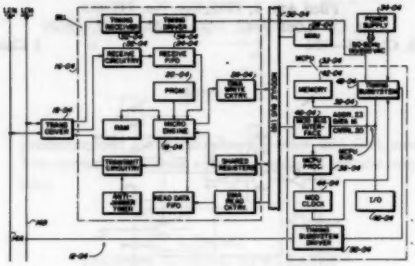
(i) a pair of p-channel FETS and a pair of n-channel FETS connected serially between a voltage source and ground and controlled by the bit A_i and the output $\overline{B}_i$ of the second inverter to produce the carry-out signal X_{i+1} when the logic level of the bits A_i, B_i differ, the pair of p-channel FETS being conductive when $A_i=0$ and $B_i=1$ to produce $X_{i+1}=1$ and the pair of n-channel FETS being conductive when $A_i=1$ and $B_i=0$ to produce $X_{i+1}=0$; and

(ii) a fifth transmission gate, conditioned by the P and $\overline{P}$ signals to produce $X_{i+1}=X_i$ when $A_i=B_i$.

4,709,347
METHOD AND APPARATUS FOR SYNCHRONIZING THE TIMING SUBSYSTEMS OF THE PHYSICAL MODULES OF A LOCAL AREA NETWORK

David L. Kirk, Phoenix, Ariz., assignor to Honeywell Inc., Phoenix, Ariz.

Filed Dec. 17, 1984, Ser. No. 682,645
Int. Cl.[4] G06F 9/00
U.S. Cl. 364—900 6 Claims



1. The method of providing synchronized and accurated timing in a distributed local area network, which network includes a plurality of modules which communicate with each other over a network bus, each module including a module central processing unit (MCPU); each MCPU including a source of clock signals, the periods of the clock signals of each of the sources of clock signals being substantially equal; each MCPU including a digital timing subsystem to which the clock signals of the sources of clock signals are applied, each of the timing subsystems producing a fine resolution timing signal, a synchronization timing signal, and a real time timing signal, each such signal having a different period; each timing subsystem also maintaining its current real time, the number of fine resolution timing signals and the number of synchronization timing signals produced since the most recent real time timing signal was produced, and the number of fine resolution timing signals produced since the last synchronization timing signal was produced; said method comprising the steps of:

designating the timing subsystem of one of the MCPU's as a Master Timing Subsystem (MTS)

causing the MTS to transmit a timing frame over the network bus to all of the other MCPU's of the netowrk, each timing frame including a synchronizing code, the number of synchronization timing signals since the last real time timing signal was produced by the MTS, and the current real time;

causing said MTS to time the transmissions of each timing frame so that the synchronizing code of each timing frame is received by the other modules substantially at the same time as the next synchronization timing signal is produced by the MTS; and

causing each timing subsystem receiving a timing frame other than the master to synchronize its count of the number of fine resolution timing signals with that of the MTS, and its current real time with that of the MTS.

4,709,348
INTERACTIVE PAGE LENGTH ADJUSTMENT WITH AUTOMATIC PAGINATION

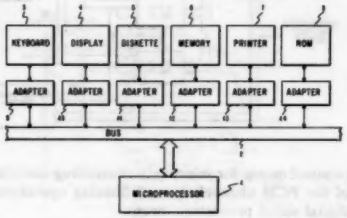
Gary R. Horn, and Robert C. Mikelsit, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

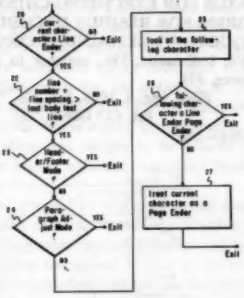
Filed Jun. 13, 1986, Ser. No. 873,753
Int. Cl.[4] G06F 9/00
U.S. Cl. 364—900 7 Claims

1. In a word processing system with a video display for operator review of input text data said system having a processor, a memory for storing said text data, and a word processing program to control said processing, the improved method for editing and adjusting the length of text pages comprising:

automatically ending a page responsive to a preset line count during creation of said page;

ending said page shorter than said automatic ending upon operator entry of a page end control code during said creation of said page; and





automatically deleting said page end control code during a subsequent page length editing adjustment operation after said creation of said page when said page end control code is positioned on said page prior to said preset line count, whereby text editing of page length may be automatically updated prior to printing to correct operator inserted page and control codes during text entry.

4,709,349
METHOD FOR MAINTAINING DISPLAY/PRINT MODE IN DISPLAY PRINTER

Sadakatsu Hashimoto, and Fumio Kamei, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

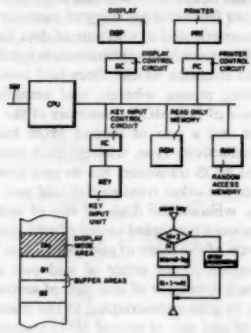
Continuation of Ser. No. 573,375, Jan. 24, 1984, abandoned. This application Apr. 28, 1986, Ser. No. 859,206
Claims priority, application Japan, Jan. 27, 1983, 58-12182
Int. Cl.[4] G06F 3/00, 13/00
U.S. Cl. 364—900 3 Claims

1. A method for preserving a display or print mode for use in a microprocessor system having a single random access memory and a display or printer which may be configured in one of a plurality of display or print modes, comprising the steps of:

storing first data representing a first said display or print mode employed for performing a first task in a first memory area of said single random access memory;

transferring said first data to a first sheltering buffer memory

area of said single random access memory when said first task is interrupted to execute a second task; and



retransferring said first data back to said first memory area of said single random access memory for resuming said first task.

4,709,350

SEMICONDUCTOR MEMORY USING MULTIPLE LEVEL STORAGE STRUCTURE

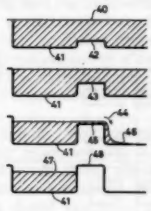
Yoshinobu Nakagome, Hachioji; Masakazu Aoki, Tokorozawa; Masashi Horiguchi, Kokubunji; Katsuhiro Shimohigashi, Musashimurayama, and Shinichi Ikenaga, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 5, 1984, Ser. No. 627,895

Claims priority, application Japan, Jul. 4, 1983, 58-120364

Int. Cl.[4] G11C *27/00*

U.S. Cl. 365—45 **15 Claims**



1. A semiconductor memory of an X-Y address system comprising:

a plurality of row address lines (word lines);

a plurality of column address lines (bit lines) disposed in parallel with one another to cross said row address lines;

memory cells disposed at points of intersection and each holding a charge storage state having one of at least three levels;

writing means coupled to said cells; and

reading means coupled to said cells,

wherein said reading means and said writing means are respectively provided for each of said column address lines; and

means for applying voltages of at least three levels in a time sequence to a plurality of said memory cells selected by one row address line in the read mode or in the write mode, respectively, whereby reading of the stored data of at least three levels stored in said selected memory cells or writing of the stored data of at least three levels into said selected memory cells is simultaneously carried out in a plurality of said memory cells.

4,709,351

SEMICONDUCTOR MEMORY DEVICE HAVING AN IMPROVED WIRING AND DECODER ARRANGEMENT TO DECREASE WIRING DELAY

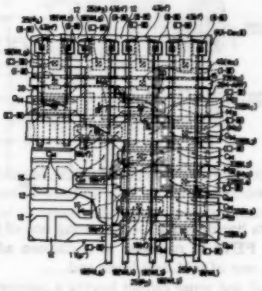
Kazuhiko Kajigaya, Kodaira, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 24, 1984, Ser. No. 685,398

Claims priority, application Japan, Dec. 23, 1983, 58-241965

Int. Cl.[4] B11C *11/40*

U.S. Cl. 365—51 **26 Claims**



5. A semiconductor integrated circuit device comprising:

a memory cell array including a plurality of word lines extending in a column direction, a plurality of bit lines extending in a row direction and intersecting with said word lines, and a plurality of memory cells disposed in predetermined ones of said intersections between said word lines and said bit lines;

a first decoder having an output portion connected electrically with said word lines; and

a plurality of signal lines elongated on said memory array and connected electrically with an input portion of said decoder, wherein each of said signal lines is provided for a predetermined number of said word lines greater than or equal to two,

wherein said first decoder includes a plurality of switching circuits respectively coupled between each of said signal lines and said corresponding predetermined number of word lines, said switching circuits each being coupled to a selection line providing selection signals to said switching circuits to operate predetermined ones of said switching circuits to couple selected word lines to said signal lines,

wherein each of said switching circuits includes a switching IGFET and a cutting IGFET having a source and drain connected between a selection line and a gate of said switching IGFET, and wherein said cutting IGFET further includes a gate electrode connected to a reference potential line.

4,709,352

MOS READ-ONLY MEMORY SYSTEMS

Shooji Kitazawa, Tokyo, Japan, assignor to OKI Electric Industry Co., Ltd., Tokyo, Japan

Filed Nov. 15, 1985, Ser. No. 798,681

Claims priority, application Japan, Nov. 19, 1984, 59-245586; Nov. 28, 1984, 59-251046

Int. Cl.[4] G11C *17/00*

U.S. Cl. 365—104 **12 Claims**

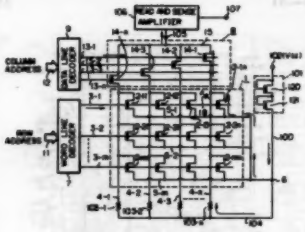
1. An MOS read-only-memory system comprising:

(a) a memory matrix having a plurality of memory cells, a plurality of data lines and a plurality of word lines; said data lines and said word lines being arranged in a matrix form, each of said memory cells comprising a MOS FET which has a gate electrode connected to each of said word lines, a source electrode connected to each of said data

lines and a drain electrode connected to a common line; said common line being connected to a high potential of a power supply;

(b) a word line decoder for selecting one of said word lines in response to a row address signal;

(c) a multiplexer connected to said data lines of said memory matrix and including a plurality of MOS FETs;



(d) a data line decoder for activating one of said plurality of MOS FETs in response to a column address signal to select one of said data lines; and

(e) a read and sense circuit having a current input terminal connected to said multiplexer and an output terminal for detecting and amplifying a current from said multiplexer through a specific memory cell in said memory matrix selected by said row address signal and said column address signal to deliver a data signal to said output terminal.

4,709,353

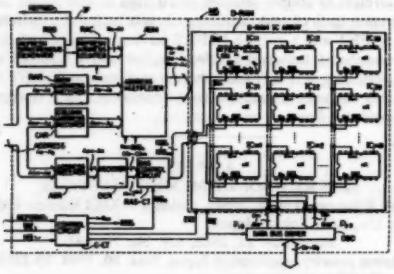
SEMICONDUCTOR MEMORY

Katsuhiro Shimohigashi, Musashimurayama; Hiroo Masuda, Kodaira; Kunihiko Ikuzaki, Hinode, and Hiroshi Kawamoto, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 854,502, Apr. 22, 1986, Pat. No. 4,646,267, which is a division of Ser. No. 756,707, Jul. 19, 1985, Pat. No. 4,592,022, which is a division of Ser. No. 638,982, Aug. 8, 1984, Pat. No. 4,539,658, which is a division of Ser. No. 377,958, May 13, 1982, Pat. No. 4,472,792. This application Dec. 15, 1986, Ser. No. 941,840

Int. Cl.[4] G11C *11/40*

U.S. Cl. 365—205 **35 Claims**



1. A semiconductor memory formed in a semiconductor integrated circuit comprising:

a pair of data lines which are formed substantially in parallel to each other;

a plurality of word lines, each of which is arranged so as to intersect with both of said pair of data lines;

a plurality of memory cells, each of which is coupled to one of said word lines and to one of said data lines, and each of which includes a MOS transistor of a first conductivity type and a capacitor;

selecting means coupled to said plurality of word lines for selecting one from said plurality of memory cells;

amplifier means coupled to said pair of data lines for amplifying a difference which appears between said data lines in response to selection of one from said memory cells by said selecting means, wherein said amplifier means includes a pair of first MOS transistors of the first conductivity type and a pair of second MOS transistors of a second conductivity type, wherein each transistor of said pair of first MOS transistors has its gate cross-coupled to the drain of the other transistor of said pair of first MOS transistors, wherein the drain of one of said pair of first MOS transistors is coupled to one of said pair of data lines and the drain of the other of said pair of first MOS transistors is coupled to the other of said pair of data lines, wherein each transistor of said pair of second MOS transistors has its gate cross-coupled to the drain of the other transistor of said pair of second MOS transistors, wherein the drain of one of said pair of second MOS transistors is coupled to one of said pair of data lines and the drain of the other of said pair of second MOS transistors is coupled to the other of said pair of data lines; and

precharging means for setting said data lines at a predetermined level between levels on said data lines obtained by operating of said amplifier means after said selecting means makes said memory cells non-selecting state.

4,709,354

SEMICONDUCTOR MEMORY DEVICE

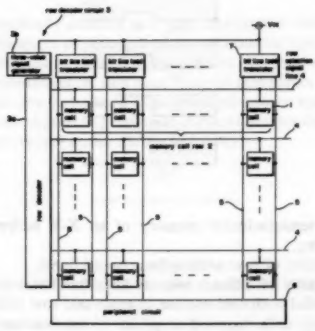
Katsuki Ichinose, and Hirofumi Shinohara, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 16, 1985, Ser. No. 788,228

Claims priority, application Japan, Oct. 16, 1984, 59-217836

Int. Cl.[4] G11C *11/40*

U.S. Cl. 365—226 **1 Claim**



1. A semiconductor memory device comprising:

a plurality of memory cell rows each including a plurality of memory cells;

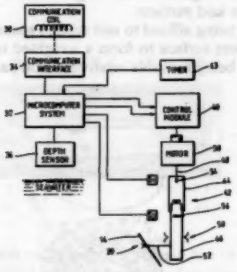
a plurality of row selection signal lines each connected to a said memory cell row for transmitting a row selection signal to the memory cells of said memory cell row; and

a row decoder for applying a row selection signal to the row selection signal line connected to the memory cell row corresponding to a row address input externally, wherein the row selection signal is at a power supply voltage level during a reading-out period, an intermediate voltage level less than the power supply voltage level during a writing-in period, and at ground level during periods other than the writing-in and reading-out periods.

4,709,355
CONTROLLER FOR MARINE SEISMIC CABLE

Theodore E. Woods, Stafford; Jimmy R. Cole, Houston, and James T. Burcham, Sugar Land, all of Tex., assignors to Syntron, Inc., Houston, Tex.

Filed Jun. 18, 1984, Ser. No. 621,492
Int. Cl.[4] G01V 1/38
U.S. Cl. 367—16 11 Claims



1. A remotely controlled depth control unit for a marine seismic cable towed behind a ship, the cable being of the type which receives from the ship depth command signals for transmission to the depth control unit for indicating the desired depth for the cable, comprising:

(a) a body;

(b) one or more diving planes moveably connected to the body, the angle of the diving plane with respect to the body controlling the depth of the control unit;

(c) stored program digital computer means responsive to said depth command signals and to stored depth indicative signals for generating angle control signals;

(d) springless moving means responsive to the angle control signals for moving said one or more diving planes to move the control unit to said desired depth;

(e) a depth sensor for providing to a storage means depth indicative signals representative of control unit depth; and

(f) storage means for storing the depth indicative signals and providing stored depth indicative signals to the computer means,

wherein the digital computer means includes means coupled to the moving means for generating a diving plane angle signal directly proportional to said diving plane angle, a stored program digital processor, and means coupling said diving plane angle signal to said digital processor whereby closed loop feedback control of said diving planes is provided for generating said angle control signals.

4,709,356
SEISMIC ARRAY POSITIONING

Ray R. Ayers, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 22, 1985, Ser. No. 800,848
Int. Cl.[4] G01V 1/38
U.S. Cl. 367—19 24 Claims

1. A method for determining the position of a seismic subarray in relation to a marine streamer, both being towed behind the stern of a vessel, comprising:

providing a first acoustic signal receiving means at least near the marine streamer;

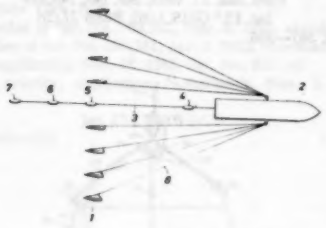
providing a second acoustic signal receiving means which is spaced-apart from the first acoustic receiving means by a known distance;

providing an acoustic signal sending means at least near the seismic subarray;

generating acoustic signals from the acoustic signal sending means at a known time;

receiving and detecting the time of receipt of the generated acoustic signals by the first and second acoustic signal receiving means; and

calculating the distance of the seismic subarray from the marine streamer based on the known distance between the

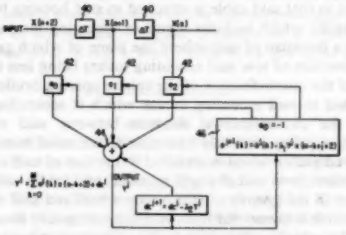


first and second acoustic signal receiving means, the known times of sending and receiving acoustic signals, and the rate of travel of sound through water at given conditions.

4,709,357
METHOD AND APPARATUS FOR ACOUSTICALLY INVESTIGATING A BOREHOLE CASING CEMENT BOND

Voldi E. Maki, Jr., Austin, Tex., assignor to Gearhart Industries, Inc., Fort Worth, Tex.

Filed Aug. 14, 1985, Ser. No. 765,914
Int. Cl.[4] G01U 1/00
U.S. Cl. 367—35 18 Claims



1. A method for determining a selected characteristic of a casing cemented in a borehole penetrating an earth formation from a reflection signal from an acoustic pulse directed from within the casing at a radial segment thereof comprising the steps of:

selecting from the reflection signal a reverberation segment substantially representative of acoustic reverberations between the casing walls at said radial segment;

selecting from said reverberation segment an input signal, a first time delayed signal, and a second time delayed signal;

multiplying said first and second time delayed signals by first and second filter parameters, respectively;

adding (i) the product of said first time delayed signal and said first filter parameters, (ii) the product of said second time delayed signal and said second filter parameter, and (iii) the inverse of said input signal to obtain an output signal;

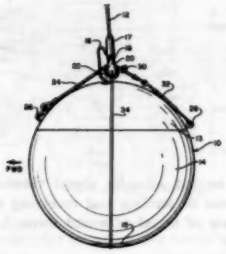
selectively adjusting said first and second filter parameters to minimize said output signal; and

utilizing at least one of said selectively adjusted adjustable filter parameters to determine said selected characteristic.

4,709,358
BRIDLE CONFIGURATION FOR TOWED UNDERWATER VEHICLE

James Appling, Canoga Park, and Calvin A. Gongwer, Glendora, both of Calif., assignors to Allied Corporation, Morristown, N.J.

Filed Jun. 17, 1985, Ser. No. 745,559
Int. Cl.[4] G01S *3/80*; B63B *21/56*
U.S. Cl. 367—106 4 Claims



1. A towed underwater transducer assembly including a spherical housing, acoustic transducer elements on the surface of said housing and a cable attached to said housing and suspended from a towing vehicle, said cable including an electrical conductor and a strength member, said housing when suspended in the water on said cable with some lateral component of velocity having a weight located opposite said cable and a center of gravity slightly forward of and significantly below its geometric center, said housing including a vent of substantial area to permit flooding of the interior of said housing, and a small projection extending around a meridian of said housing approximately normal to the direction of tow, characterized in that said cable is attached to said housing by means of a bridle which includes a pair of mounting means aligned along a meridian of said sphere the plane of which extends in the direction of tow said mounting means being less than one half of the circumference of the sphere apart, a bridle cable is attached to said mounting means which is somewhat longer than the circumferential distance between said mounting means, a pulley assembly including strain relief means and a grooved pulley wheel is attached to the end of said cable and suspended from said strength member, said bridle cable being carried in the groove of said pulley wheel and said electrical conductor is connected from said support to said housing and includes extra length to permit said pulley to move a significant distance along said cable without loading said electrical conductor, such that when said transducer is towed by said vehicle, said pulley wheel will respond to the resulting horizontal component of force by moving along said bridle cable as required to keep the projected line of the tow cable passing substantially through the geometric center of said spherical housing.

4,709,359
END WEIGHTED REED SOUND TRANSDUCER

Rayford A. Loftin, Fort Wayne, Ind., assignor to Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind.

Filed Jun. 28, 1982, Ser. No. 392,657
Int. Cl.[4] H04R *17/00*
U.S. Cl. 367—155 28 Claims

1. Electroacoustic transducer apparatus for sensing and providing acoustic wave direction in a fluid acoustic medium comprising:

a rigid support base having a substantially planar support surface;

a wall having a wall area; said wall being attached to and extending substantially perpendicularly from said surface to form a walled base;

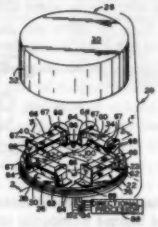
an inertia weight;

a flexible, planar, resilient reed having an electroacoustic transducer laminate on at least one side thereof that bends to convert between an electrical signal and a corresponding degree of reed bend; said reed having a first edge and a second edge opposite to said first edge;

said reed being cantilevered from said support base surface at said first edge and extending substantially perpendicularly from said surface;

said weight being affixed to said reed in spaced relation from said support surface to form a weighted transducer reed;

said weight being movable relative to said base in a direction



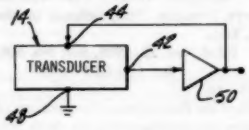
that has a component transverse to the plane of said reed whereby sound waves impinging on said wall and having a directional component transverse to the plane of said reed will cause relative transverse movement between said base and said weight to apply a bending moment to said reed;

means for suspending said base in a fluid acoustic medium and being free of contact with a solid surface so that said base can move in said medium in correspondence with acoustic waves impinging on the area of said wall; the larger the wall area impinged upon the larger the force between said base and said weight for moving said base in said medium relative to said weight thereby increasing the degree of the bend of said reed and increasing the amplitude of the corresponding electrical signal.

4,709,360
HYDROPHONE TRANSDUCER WITH NEGATIVE FEEDBACK SYSTEM

Robert J. Martin, and Claude Sims, both of Orlando, Fla., assignors to Sparton Corporation, Jackson, Mich.

Filed Nov. 12, 1985, Ser. No. 796,909
Int. Cl.[4] H04R *17/00*
U.S. Cl. 367—157 13 Claims



1. In a sonic transducer of the type comprising a plate-like piezoelectric body mounted for vibration, a common electrode on one face of the body and a signal electrode on the other face of the body, and signal amplifying means coupled with the signal electrode, the improvement comprising:

a feedback electrode on one of said faces of the body,

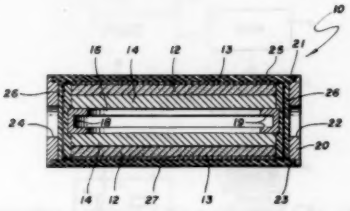
and feedback means for coupling negative feedback energy through said amplifying means between said signal electrode and said feedback electrode.

4,709,361

FLEXURAL DISK TRANSDUCER

David K. Dahlstrom, Los Angeles; Merrill E. Fife, Canyon Country, both of Calif., and Charles R. Judy, Livingston, Tex., assignors to Allied Corporation, Morristown, N.J.

Filed Oct. 30, 1986, Ser. No. 924,958
Int. Cl.[4] H04R 17/00
U.S. Cl. 367—165 9 Claims



1. A flexural disk transducer including a pair of piezoelectric ceramic disks poled in the thickness direction and having highly conductive plating layers on the opposite flat surfaces of said disks, metal backing plates of substantial thickness bonded to one side of each of said disks, a thin metal plate bonded to the opposite side of each of said disks, and spacing means positioned between said disks in contact with said backing plates

characterized in that said spacing means comprises a center support ring cemented to said backing plates whose outside diameter is substantially the same or slightly greater than the diameter of said disks, said ring having a rectangular "C" shaped cross section open toward its center, the axially extending web of said ring being sufficiently thin to render said ring compliant with movement of said disks.

4,709,362

OSCILLATING ORBITAL VIBRATOR

Jack H. Cole, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Sep. 27, 1985, Ser. No. 781,385
Int. Cl.[4] H04R 11/00
U.S. Cl. 367—189 19 Claims

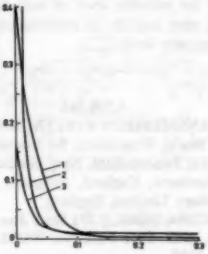
1. An oscillating orbital vibrator comprising;
(a) a rotatable shaft;
(b) a crank mounted on said shaft for rotation therewith, said crank having an outer periphery;
(c) a first race of a cylindrical bearing affixed to said outer periphery of said crank;
(d) a reaction mass having a cylindrical opening therein, said opening having an inner periphery;
(e) a second race of said cylindrical bearing affixed to said inner periphery of said opening;
(f) bearing means positioned between said first and second bearing races; whereby when said shaft and crank are rotated, said reaction mass orbitally oscillates with respect thereto inducing a vibratory motion.

4,709,363

OPTICALLY READABLE INFORMATION DISC HAVING A REFLECTION LAYER FORMED FROM A METAL ALLOY

Albertus G. Dirks, Eindhoven, and Hidde H. Brongersma, Waalre, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 708,362, Mar. 4, 1985, abandoned, Continuation of Ser. No. 364,351, Apr. 1, 1982, abandoned. This application Nov. 25, 1986, Ser. No. 935,148
Claims priority, application Netherlands, Nov. 5, 1981, 8102283
Int. Cl.[4] G11B 3/70
U.S. Cl. 369—275 1 Claim



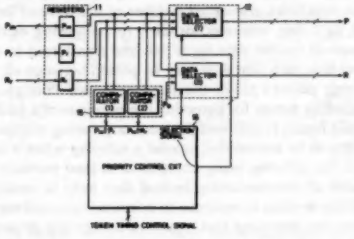
1. An optically readable information disc comprising a substrate plate upon at least one side of which substrate plate a layer of a synthetic resin provided with a reflecting optical structure is present, said reflecting optical structure comprising an information track of information areas situated alternately at a higher level and at a lower level of said layer of synthetic resin, which areas are covered with a reflection layer of metal adhering to said areas, characterized in that the reflection layer is a layer of an essentially regular thickness of a Ag-Cu-Al alloy at least 40 at.% Ag, at least 1 at.% of Cu and of Al being present.

4,709,364

NETWORK PRIORITY DETERMINING METHOD

Toshiharu Hasegawa, No. 15-2, Fukakusa gansho-cho, Fushimi-ku, Kyoto-shi, Kyoto; Zai-ming Shen, Kyoto; Shoujiro Muro, Osaka; Shigeru Masuyama, Kyoto, and Akihisa Toyooka, Osaka, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka and Toshiharu Hasegawa, Kyoto, both of, Japan

Filed Jul. 25, 1985, Ser. No. 758,986
Claims priority, application Japan, Jul. 25, 1984, 59-155941; Jul. 25, 1984, 59-155942; Jul. 25, 1984, 59-155943
Int. Cl.[4] H04J 3/02
U.S. Cl. 370—85 11 Claims



1. A network priority determining method wherein free tokens and busy tokens are circulated among a plurality of

nodes connected in a network, each token having a priority indication field for controlling a priority level and a reservation field for reserving transmission, said method comprising the steps of:

circulating a first free token;

at one of said nodes, transmitting a data packet in response to said first free token;

during said step of transmitting, circulating from the transmitting node a busy token;

comparing at the transmitting node, the reservation field of said busy token with the priority level of said data packet; and,

circuiting from the transmitting node a second free token, said second free token having in its priority indication field the higher one of said reservation field of said busy token and the priority level of said data packet in said comparing step and in its reservation field the lowest available priority level.

4,709,365

DATA TRANSMISSION SYSTEM AND METHOD

Nicholas C. L. Beale, Wraysbury, Nr Staines, England; Roger W. Rushbrooke, Beaconsfield, New Zealand, and Philip J. S. Gladstone, Newbury, England, assignors to Beale International Technology Limited, England

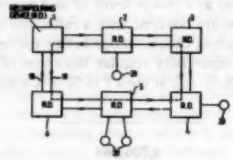
PCT No. PCT/GB84/00366, § 371 Date Jun. 28, 1985, § 102(e) Date Jun. 28, 1985, PCT Pub. No. WO85/02078, PCT Pub. Date May 9, 1985

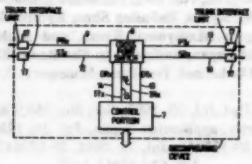
PCT Filed Oct. 31, 1984, Ser. No. 755,328

Claims priority, application United Kingdom, Oct. 31, 1983, 8328978; Jul. 13, 1984, 8417906

Int. Cl.[4] G06F *11/16*

U.S. Cl. 371—11 **15 Claims**





1. A data transmission system comprising a plurality of reconfiguring devices, each device having a plurality of input and output data links, a selected number of the devices being connected to a ring whereby for each reconfiguring device, data is received on one data input link and transferred to one data output link such that data may be passed between all the reconfiguring devices along the ring, each said configuring device including means for detecting the presence of a fault in the ring, said means in different devices cooperating to attempt to cause data to be transmitted around a sub-ring when a fault is detected, the sub-ring being constituted at least partially by one or more of the previously unused data links to enable a number of the devices to continue to communicate; and means for merging for detecting that a new reconfiguring device is connected to at least one pair of previously unused data input and output links and for reconfiguring the ring to include the new device.

4,709,366

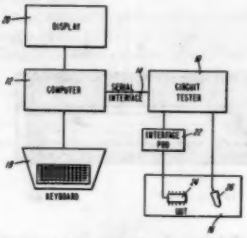
COMPUTER ASSISTED FAULT ISOLATION IN CIRCUIT BOARD TESTING

Marshall H. Scott, Woodinville, and John D. Polstra, Seattle, both of Wash., assignors to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Jul. 29, 1985, Ser. No. 761,027

Int. Cl.[4] G01R *31/28*

U.S. Cl. 371—20 **15 Claims**



1. A system for isolating circuit faults in a unit under test (UUT) including a circuit board to which are connected electronic components interconnected at circuit nodes on a bidirectional bus, the system comprising:

generator means for generating first stimulus pattern signals for exercising nodes of said UUT in one direction of said bidirectional bus and for generating second stimulus pattern signals for exercising nodes of said UUT in an opposite direction of said bidirectional bus;

interface means for applying the stimulus pattern signals to the UUT;

measurement means responsive to the direction of said bidirectional bus through which nodes are exercised for measuring responses of the UUT to the first or second stimulus pattern signals at the circuit nodes;

programmed computer means having memory means storing circuit topology data of the UUT, predetermined stimulus pattern signals associated with various circuit nodes of the UUT and responses expected from those nodes;

said computer means including means for controlling said generator means to generate selectively said first and second stimulus pattern signals depending upon the particular circuit node responses being measured by said measurement means, comparing measured and predetermined responses and, in response, isolating circuit faults;

data entry means for entering into said computer means data identifying circuit nodes being measured by said measurement means; and

means responsive to said computer means for guiding said measurement means to appropriate nodes to be measured and for making circuit fault accusations.

4,709,367

METHOD AND APPARATUS FOR DISTINGUISHING BETWEEN DISKETTES IN A DISKETTE DRIVE

Robert J. Grafe, and Steven T. Pancoast, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 31, 1986, Ser. No. 846,340

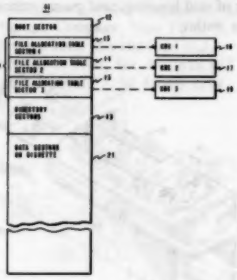
Int. Cl.[4] G06F *11/10*; G11B *5/02*

U.S. Cl. 371—38 **12 Claims**

1. A method for distinguishing between diskettes in a diskette drive system, wherein each diskette contains a unique file allocation table, said method comprising:

calculating and storing a CRC value for the file allocation table on a diskette each time the file allocation table is accessed;

comparing each calculated CRC value to the most recently stored CRC value; and,



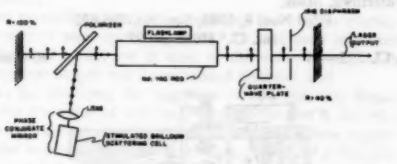
providing a warning when a calculated CRC value is not equal to the most recently stored CRC value.

4,709,368

SIDE-ARM PHASE-CONJUGATED LASER

Robert C. Fukuda, Alexandria, and Suresh Chandra, Falls Church, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 24, 1985, Ser. No. 779,762
Int. Cl.[4] H01S 3/11
U.S. Cl. 372—10 **2 Claims**



1. A phase-conjugated Q-switched laser including:
a starter cavity defined by opposed reflectors;
a laser active material in said starter cavity;
a pump for said laser active material;
a side-arm containing a phase conjugate mirror consisting of a lens and a stimulated Brillouin scattering cell;
means for optically coupling said starter cavity to said side-arm and including a quarterwave plate and a polarizer in said starter cavity, wherein said cell acts as a Q-switch by undergoing stimulated Brillouin scattering when the laser active material is pumped by said pump and a laser beam of sufficient power is reached.

4,709,369

POWER CONTROL SYSTEM FOR CONTROLLING THE POWER OUTPUT OF A MODULATED LASER DIODE

Peter G. Howard, Junction City, Oreg., assignor to Spectra-Physics, Inc., San Jose, Calif.

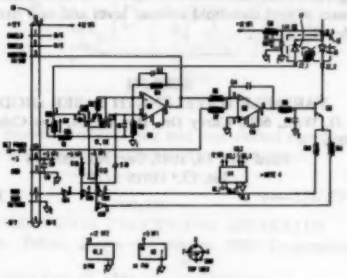
Filed Jun. 18, 1985, Ser. No. 746,171
Int. Cl.[4] H01S 3/10, 3/13
U.S. Cl. 372—38 **4 Claims**

1. A power control system for controlling the power output of a modulated laser diode of the kind used in printers where the modulation of the light output may be 100%. modulaton between full on and full off and of the kind where there is a need to keep stable the value of the current needed to turn the laser diode on to the desired power level after relatively long periods of time when the laser diode is off and during which long periods of time no updating informaton is generated for the power control system, said power control system comprising,

set power means for producing a DC voltage demand signal representing the laser diode power output that is desired to be produced,

a sense diode associated with and connected to the laser diode,

conditioning means for receiving current pulses of a signal to be evaluated from the sense diode and for establishing a DC voltage which represents the peak value of the light pulses out of the laser diode independent of the modulation pattern of the light pulses, the signal from the sense



diode being a measure of the power produced in the laser diode,

integrator feedback loop means for comparing the desired power with the output from the conditioning means and for establishing an output current which causes the laser diode to make light pulses of the correct value, and

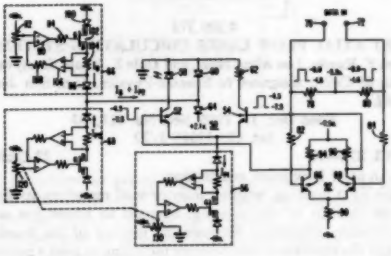
wherein the conditioning means include sample and hold means for acting in association with the integrator feedback means at a rate to perform in all substantial respects as if the modulated, chopped light output of the laser diode were continuously on and for producing in a symmetric manner effective control in real time both for an increase and for a decrease in the signal to be evaluated.

4,709,370

SEMICONDUCTOR LASER DRIVER CIRCUIT

James P. Bednarz, Union County, and David D. Freedman, Burlington County, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Jun. 17, 1985, Ser. No. 744,956
Int. Cl.[4] H01S 3/00
U.S. Cl. 372—38 **16 Claims**



1. A driver circuit for a laser diode, said laser diode having first and second terminals, said first terminal of said laser diode being coupled to a reference voltage, said laser diode having a threshold current level such that current flow through said

laser diode exceeding said threshold current level causes lasing action of said laser diode, said driver circuit comprising:

a current switching device having input, output and control terminals, said switching device being coupled at said input terminal to said second terminal of said laser diode, said current switching device being responsive to a first voltage level at said control terminal for enabling a first level of current from said input terminal to said output terminal and responsive to a second voltage level at said control terminal for disabling current flow through said switching device; and

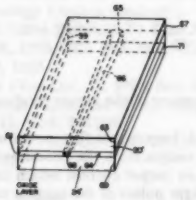
means for supplying a constant current to said input terminal, for supplying a level of said constant current which is greater than said threshold current level and less than the sum of said threshold current level and said first current level.

4,709,371

VARIABLE WAVELENGTH LASER DIODE

Fred D. West, 6800 Curry Dr., Box 32514, The Colony, Tex. 75056

Filed Oct. 18, 1985, Ser. No. 789,194
Int. Cl.[4] H01S *3/19*
U.S. Cl. 372—44 **11 Claims**



1. A variable wavelength semiconductor laser comprising:

a first semiconductor layer;

a second semiconductor layer having first and second surfaces, said first surface contiguous with said first semiconductor layer forming a light emitting junction at the interface of said first and second semiconductor layers;

an oxide layer contiguous with said second surface of said second semiconductor layer;

said oxide layer having a first opening of cross sectional area positioned within a first edge of said oxide layer and a second opening of cross sectional area larger than the first opening and positioned in a second edge opposite the first edge; and

tapered passage means positioned between said first and second openings completing a passage therethrough.

4,709,372

FAST AXIAL FLOW LASER CIRCULATING SYSTEM

Joseph F. Rando, Los Altos Hills, and Dale E. Koop, Sunnyvale, both of Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.

Filed Dec. 19, 1985, Ser. No. 811,593
Int. Cl.[4] H01S *3/22*
U.S. Cl. 372—58 **23 Claims**

1. An axial flow laser, comprising:

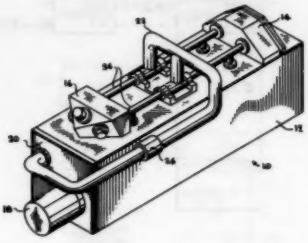
a gas tight housing, without interior wall members dividing the interior of the housing, adapted to house gas at a pressure differential between the interior of the housing and the exterior of said housing including at least a portion removable from the remainder of said housing, said housing providing a gas ballast for said laser;

an optical resonator defining a lasing region positioned at the exterior of said housing;

heat exchanger means disposed in said housing;

means for introducing and circulating gas to and from said heat exchanger means;

non-diffuser positive displacement pump means disposed in the interior of said housing, said pump means including an inlet and an outlet;



conduit means forming a gas tight closed fluid path from said resonator to said heat exchanger means from said heat exchanger to said pump means, and from said interior of said housing to said resonator; and

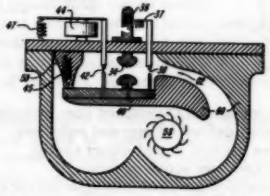
means sealably introducing or removing gas to and from said housing interior.

4,709,373

LASER EXCITATION SYSTEM

Peter B. Scott, Bedford, Mass., and Kristian Hohla, Herrsching, Fed. Rep. of Germany, assignors to Summit Technology, Inc., Watertown, Mass.

Filed Nov. 8, 1985, Ser. No. 796,602
Int. Cl.[4] H01S *3/097*
U.S. Cl. 372—86 **10 Claims**



1. An excitation system for applying a high voltage source to induce a discharge in a laser medium within a chamber, the excitation system comprising:

a. At least one capacitor capable of storing an electric pulse from the high voltage source prior to discharge;

b. a fixed potential electrode, capable of draining the electric pulse upon laser discharge;

c. a floating electrode;

d. a laser discharge region defined by a volume between the fixed potential electrode and the floating electrode;

e. at least one first spark-inducing element, electrically connected to the high voltage source and the floating electrode, the first spark-inducing element serving to preionize the medium by generating ultraviolet radiation within the chamber during the charging of the capacitor; and

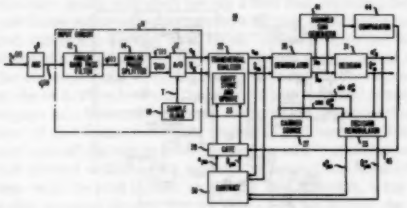
f. at least one second spark-inducing element, electrically connected to the floating electrode and the capacitor, the second spark-inducing element serving to likewise preionize the medium by generating ultraviolet radiation within the chamber during the charging of the capacitor and also serving to sustain the generation of ultraviolet radiation within the chamber during laser discharge.

4,709,374

TECHNIQUE FOR DECISION-DIRECTED EQUALIZER TRAIN/RETRAIN

Cecil W. Farrow, Highlands, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.

Filed Jul. 5, 1984, Ser. No. 628,147
Int. Cl.[4] H03H *7/30*; H04B *3/04*
U.S. Cl. 375—13 38 Claims



15. Apparatus for processing a received data signal transmitted to said apparatus over a communication channel, said received data signal representing a succession of transmitted data symbols of a predetermined signal constellation, said apparatus comprising

means for equalizing said received signal to form a succession of equalizer outputs, each equalizer output representing a respective one of the transmitted symbols,

means for forming for said each equalizer output an associated decision as to the value of the respective transmitted symbol,

means normally operative for updating the transfer characteristic of said equalizing means for said each equalizer output as a function at least of the value of said each equalizer output and its associated decision, and

means for inhibiting the operation of said updating means when the value of said each equalizer output is one of a predetermined plurality of values each of whose magnitudes is greater than the magnitude of each of a first plurality of the data symbols of said constellation and less than the magnitude of each of a second plurality of the data symbols of said constellation, while not inhibiting the operation of said updating means when the value of said each equalizer output is other than one of said predetermined plurality of values.

4,709,375

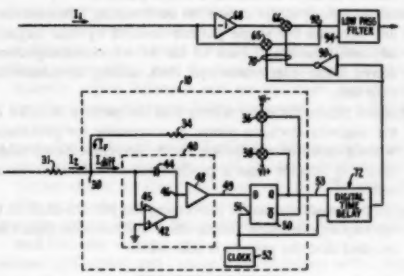
DIGITAL PHASE SELECTION SYSTEM FOR SIGNAL MULTIPLIERS

Michael A. Robinton, Palo Alto, and Alan H. Starkie, San Jose, both of Calif., assignors to Robinton Products, Inc., Sunnyvale, Calif.

Continuation-in-part of Ser. No. 536,558, Sep. 27, 1983, abandoned. This application Oct. 18, 1983, Ser. No. 543,095
Int. Cl.[4] H04B *14/06*
U.S. Cl. 375—27 45 Claims

1. Apparatus for producing a product signal from first and second input signals, said apparatus comprising:

shift means for introducing a selected time shift in said first signal with respect to said second signal so as to produce a time-shifted signal which is changeable in amplitude at first clock times which occur at equal first clock intervals and wherein the duration of said time shift is equal to a plurality and integral number of said first clock intervals, said shift means including modulating means for modulating said first signal so as to produce a modulated signal changeable between two levels at second clock times which occur at second clock intervals, with the average amplitude of said modulated signal over time being indicative of the amplitude of said first signal, and with said modulated signal being utilized by said shift means to produce said time-shifted signal; and



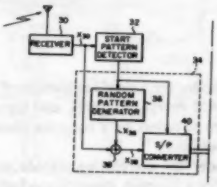
multiplier means for multiplying said time-shifted signal and said second signal to generate said product signal.

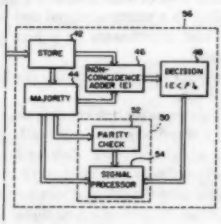
4,709,376

RECEIVED SIGNAL PROCESSING APPARATUS

Kouzou Kage, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Feb. 19, 1986, Ser. No. 830,669
Claims priority, application Japan, Feb. 22, 1985, 60-34226; Feb. 22, 1985, 60-34227
Int. Cl.[4] H04B *1/10*; H04L *1/08*
U.S. Cl. 375—58 4 Claims





1. An apparatus for processing a digital received signal in which the same information appears repeatedly, comprising:

start pattern detector means for detecting a start pattern which precedes M repetitive information patterns which are transmitted;

information pattern receive means for receiving the M information patterns timed to detection of the start pattern by said start pattern detector means;

store means for storing the M information patterns which are received by said information pattern receive means;

majority decision means for applying majority decision to the M information patterns, which are stored in said store means, on a basis of bits which represent the same information so as to determine a single pattern;

noncoincidence adder means for determining noncoincident bits between the single pattern decided by said majority decision means and each of the M information patterns stored in the store means and, then, adding the noncoincident bits;

decision means for determining that the pattern decided by the majority decision means is acceptable for processing when a result of summation by the noncoincidence adder means is smaller than a predetermined reference value; and

signal processor means for processing the pattern decided by the majority decision means when said decision means has decided that the pattern is acceptable.

4,709,377

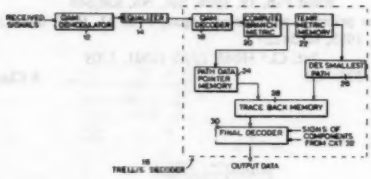
VITERBI DECODER FOR WIRELINE MODEMS

Kenneth Martinez, Pinellas Park, and Gregory Mack, St. Petersburgh, both of Fla., assignors to Paradyne, Largo, Fla.

Filed Mar. 13, 1985, Ser. No. 710,978

Int. Cl.[4] H04L *5/12, 27/06*

U.S. Cl. 375—75 **3 Claims**



1. A trellis decoder for a receiver section of a QAM modem for decoding QAM received signals, said signals being represented by a series of points on a complex plane, comprising:

a QAM demodulator;

a QAM decoder for converting signals which have been received from a channel, demodulated and equalized to a form in which they represent said series of points on said complex plane;

means connected to an output of said QAM decoder for computing branch metrics having means for determining coordinates of a set of ideal points of a signal constellation corresponding to a received signal and having means for translating said coordinates to a first quadrant of said complex plane;

temporary memory means for storing the branch metrics of each ideal point;

path calculating means for determining the coordinates to be assigned to a received signal, said path calculating means comprising a smallest path determination circuit connected to an output of said temporary memory and functioning to calculate the smallest metric distance between a point calculated for said received signal and a closest said ideal point, a trace back memory connected to an output of said smallest path determination circuit and functioning to trace back a number of previously received bauds to generate a final received point;

a path data pointer memory connected to an output of said means for computing branch metrics and having an output to said trace back memory; and

final decoding means connected to an output of said for decoding the coordinator of a received point, said coordinates having been determined by said path calculating means.

4,709,378

ARRANGEMENT FOR GENERATING A CLOCK SIGNAL

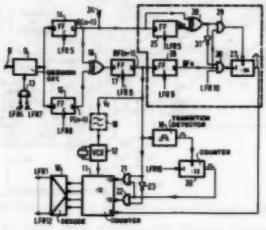
Kornelis J. Wouda, and Wilhelmus J. M. Reijntjens, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 22, 1985, Ser. No. 725,464

Claims priority, application Netherlands, Apr. 24, 1984, 8401310

Int. Cl.[4] H04L *7/02*

U.S. Cl. 375—110 **12 Claims**



1. Apparatus for generating clock signals from a received biphase modulated signal having a plurality of consecutive symbol intervals and a first or a second polarity, comprising

a controllable clock signal source;

means for sampling the polarity of said received signal at a first and second instant within at least one of said symbol intervals, said first and second instant being separated by less than half of said one symbol interval, and generating a first and second polarity signal respectively corresponding thereto;

comparing means connected to said polarity sampling means for comparing said first and second polarity signals with each other and generating a first control signal or a second control signal corresponding, respectively, to absence or presence of equality therebetween, whereby only one active transition per symbol interval is detected; and

means for applying said first or second control signal to said controllable clock signal source for readjusting the frequency and phase thereof, said controllable clock signal source generating said clock signals.

4,709,379

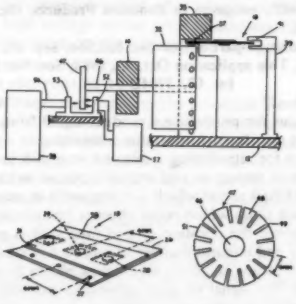
TAPED PARTS COUNTER

Dennis K. Siemer, R.R. 5, Box 122C, Mankato, Minn. 56001

Filed Nov. 7, 1986, Ser. No. 928,029

Int. Cl.[4] G06M *7/00*

U.S. Cl. 377—3 **8 Claims**



1. Apparatus for counting small parts encapsulated at equal and predetermined spaced intervals along a storage tape which

comprises a supply reel of storage tape having small parts encapsulated at equal intervals along said tape, said tape having a first edge and a second edge having drive holes, said drive holes being equally spaced at predetermined intervals with a separation at even multiples of the predetermined spaced intervals of said parts, an elongated frame means having a first and second extension, means for rotatably attaching said reel to the first extension of said frame means, a bottom tape guide mounted on said frame means intermediate of said first and second extensions, a shaft mounted in said frame means intermediate said first and second extension and adjacent said bottom tape guide, said shaft having a first end extending beyond said frame means adjacent said bottom tape guide and a second end extending beyond said frame means, a sprocket in the shape of a wheel attached to said first end, pins mounted about the circumference of said sprocket at intervals corresponding to the separation between the holes on said tape and adapted to engage said holes, drive means mounted on the second extension of said frame means for engaging said tape and drawing said tape off the supply reel mounted on said first extension and into contact with the said sprocket to engage the holes of said tape with the said pins to rotate the said sprocket, a top tape guide mounted on said bottom tape guide to capture the edge of said tape having holes between the top and bottom tape guides to direct the tape into alignment with said sprocket and into engagement with said pins, a radiation interrupter wheel having first and second sides attached to the second end of said shaft, said interrupter wheel having radially extending fins separated by slots, said fins being spaced about the circumference of said wheel to correspond to the spaced intervals between said pins, a radiation emitter, a photosensitive element, said emitter and photosensitive element mounted adjacent said frame and separated by said fins, said fins interrupt radiation at intervals corresponding to the spaced intervals between said pins, electrical impulse counting means connected to said photosensitive element to count electrical impulses generated by said photosensitive element from radiation emitted by said emitter passing between said fins as said wheel is rotated by said sprocket whereby said small parts along said tape are represented correspondingly by said slots and are thereby counted.

4,709,380

BUCKET BRIGADE CHARGE TRANSFER DEVICE WITH AUXILIARY GATE ELECTRODE

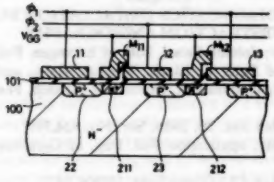
Minoru Itoh, Nagaokakyo, Japan, assignor to Matsushita Electronics Corporation, Kadoma, Japan

Continuation of Ser. No. 471,725, Mar. 3, 1983, abandoned. This application Jan. 6, 1986, Ser. No. 816,956

Claims priority, application Japan, Mar. 9, 1982, 57-37769

Int. Cl.[4] G11C *19/28;* **H01L** *29/78*

U.S. Cl. 377—58 **1 Claim**



1. A charge transfer device having a plurality of series-connected unit cells each comprising:

a substrate formed of a first conductivity type;

a plurality of source/drain regions formed on the surface of said substrate and having a second conductivity type, said source/drain regions being spaced with respect to one another;

a charge transfer region between said source/drain regions, which is formed by making the surface impurity concentration under said auxiliary gate electrode higher than that under said gate electrodes;

a plurality of gate electrodes each individually aligned with one of said source/drain regions such that each of said gate electrodes extend partially over said charge transfer regions between a pair of source/drain regions and partially over an associated one of said source/drain regions;

at least one auxiliary gate electrode aligned over the charge transfer region between said source/drain regions, said auxiliary gate electrode being impressed with a DC bias voltage;

a partially thickened oxide insulative film at said auxiliary gate electrode such that said oxide insulative film is thicker at said auxiliary gate electrode than the gate oxide film under the gate electrodes;

a single voltage source for generating said clock pulses and said DC bias voltage; and

means for forming said charge transfer region with a higher absolute value of threshold voltage than that of said source/drain regions.

4,709,381

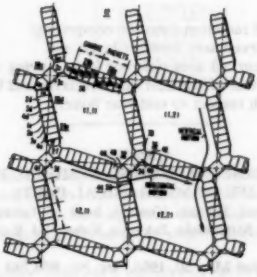
CCD FOCAL PLANE ARRAY CONVOLVER

Paul R. Beaudet, Upper Marlboro, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 19, 1986, Ser. No. 841,396

Int. Cl.[4] G11C *19/28;* **H01L** *29/78, 27/14;* **G06G** *7/12*

U.S. Cl. 377—62 **4 Claims**



1. A semiconductor CCD focal plane array convolver which permits performing convolution functions on the focal plane array, and comprises:

(a) an X-Y array of photosensitive pixels disposed in a semiconductive substrate;

(b) a CCD roadway means comprising a pattern of rows and columns of conductive gates upon the substrate, which rows and columns of gates surround and define the X-Y array of pixels, with the gate configuration being selected to permit charge to be accumulated in a first charge holding packet defined for a positive convolution coefficient, and in a paired second charge holding packet for a negative convolution coefficient for each individual pixel;

(c) means for applying clocked signals to the CCD gates associated with respective pixels to permit charge to be injected from respective pixels into the respective paired first and second charge holding packets, with the accumulated charge in any charge holding packet being determined by the integrated input radiation period and image intensity at the respective pixel; and for moving the charge holding packets along the CCD roadway to accumulate charge from a predetermined subarray of neighboring pixels to implement a predetermined linear convolution, and for moving the charge stored in paired charge holding packets accumulated from already processed

convolutions along the CCD roadway to the periphery of the CCD roadway;

(d) means on the semiconductive substrate at the CCD roadway periphery for differencing the accumulated charge stored in paired charge holding packets to difference the positive and negative convolution contributions to provide a convolution output signal.

4,709,382

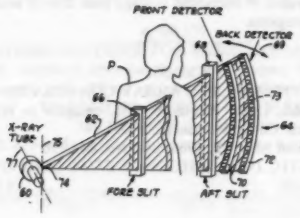
IMAGING WITH FOCUSED CURVED RADIATION DETECTORS

Richard A. Sones, Cleveland Heights, Ohio, assignor to Picker International, Inc., Cleveland, Ohio

Filed Nov. 21, 1984, Ser. No. 673,779

Int. Cl.[4] G01T *1/161*

U.S. Cl. 378—62 **35 Claims**



1. A focused radiation detector comprising:

(a) a rear curved area detector layer, and

(b) a front curved area detector layer having a curvature similar to that of said rear detector layer and being superposed with respect to said rear layer.

4,709,383

METHOD FOR EVALUATING RESIDUAL FATIGUE LIFE OF MECHANICAL PARTS

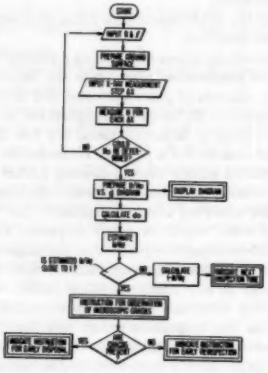
Touru Goto, and Takashi Konishi, both of Takasago, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 30, 1986, Ser. No. 868,744

Claims priority, application Japan, Apr. 21, 1986, 61-90025

Int. Cl.[4] G01N *23/20*

U.S. Cl. 378—72 **5 Claims**



1. A method for evaluating a residual fatigue life of mechanical parts characterized by the steps of grinding a minute amount of a surface layer of a mechanical part to be inspected to form an inspection surface, measuring half-width data of an X-ray diffraction intensity curve at points corresponding to various depths below the surface layer along said inspection surface and determining a depth (do) below the surface layer of a fatigue damaged region of the mechanical part inspected from a graph of a half-width ratio (H/Ho) versus a depth (d) below the surface layer where H is the measured half-width of the X-ray diffraction intensity curve and Ho is the half-width of the X-ray diffraction intensity curve at a depth below the surface layer of the mechanical part which has not been damaged by fatigue, and determining a fraction of fatigue life N/Nf on the basis of data of said depth (do) of the fatigue damaged region versus the fraction of fatigue life N/Nf which were separately obtained from a test piece.

4,709,384

LAUE CAMERA

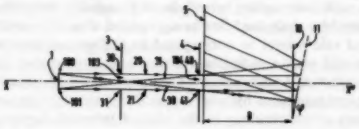
Claude Schiller, Savigny-sur-Orge, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 4, 1986, Ser. No. 825,845

Claims priority, application France, Feb. 12, 1985, 85 01933

Int. Cl.[4] G01N *23/203, 23/207*

U.S. Cl. 378—76 **2 Claims**



1. A Laue camera comprising

X-ray source means for directing an X-ray beam at a sample, said X-ray source means being defined by two focal dimensions and an exposure angle to represent a focus of said X-ray source means,

wherein said exposure angle is of a value to provide two apparent focal dimensions of the same size,

holder means for holding photographic film, and

collimator means between said X-ray source means and said holder means for collimating said X-ray beam, said collimator means including two diaphragms, and said collimator means being placed adjacent said holder means,

wherein said two diaphragms having openings of a diameter equal to said two apparent focal dimensions, and wherein means for supporting said sample is provided at a surface of said film opposite to said X-ray source means.

4,709,385

X-RAY DIAGNOSTICS INSTALLATION FOR SUBSTRACTION ANGIOGRAPHY

Manfred Pfeiler; Johann Seissl, both of Erlangen, Fed. Rep. of Germany, and Peter C. Block, Weston, Mass., assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jan. 30, 1986, Ser. No. 824,105

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1985, 3503722

Int. Cl.[4] H05G *1/64;* H04N *5/32*

U.S. Cl. 378—99 **12 Claims**

1. An x-ray diagnostics installation for monitoring a dynamic body cycle of a patient comprising:

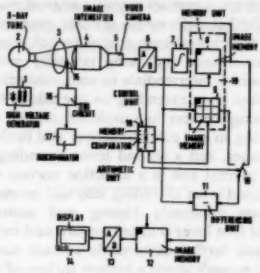
means for generating an x-ray beam directed at said patient;

an x-ray image intensifier video chain for generating a video signal from x-rays passing through said patient;

an image memory connected to an output of said image intensifier video chain having a plurality of addresses for storing a plurality of individual x-ray video signals obtained during said body cycle;

a differencing unit connected to an output of said image memory and to said output of said image intensifier video chain for subtracting a stored video signal from a current video signal;

pick-up means connected to said patient for identifying a plurality of selected occurrences in said cycle; and



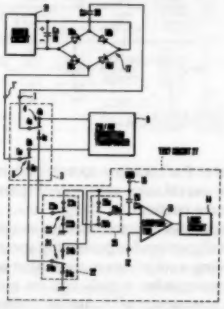
control means for said image memory connected to said pick-up means for enabling entry of said video signals into said image memory following one of said selected occurrences and enabling readout of said image memory to said differencing unit synchronous with said occurrences for superimposing said current video signal on said plurality of video signals obtained during said cycle.

4,709,386

SUBSCRIBER LINE MONITORING CIRCUIT

Toshimitsu Shimizu, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed May 12, 1986, Ser. No. 862,042
Claims priority, application Japan, May 17, 1985, 60-103920
Int. Cl.[4] H04B *3/46*
U.S. Cl. 379—24 **6 Claims**



1. A circuit for monitoring a capacity of a subscriber line to which a capacitor equivalently representative of a telephone set is connected, said monitoring circuit comprising;

a test circuit for measuring said subscriber line capacity, and first means operative to connect said subscriber line to said test circuit, said test circuit comprising;

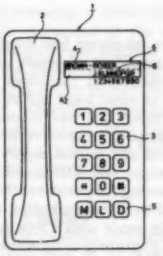
second means for applying a voltage to said subscriber line, a reference capacitor connectable in series with said equivalent capacitor, third means for determining the capacity of said subscriber line, whereby after the connection of said subscriber line to said test circuit is established, said second means is first operative to apply a backward voltage to said subscriber line to discharge said equivalent capacitor, thereafter to apply a forward voltage to said subscriber line through said reference capacitor to charge said equivalent capacitor, thereby allowing said third means to measure a voltage appearing across said equivalent capacitor connected to said subscriber line, thus to determine said capacity of said subscriber line.

4,709,387

MULTIFUNCTIONAL TELEPHONE

Shinichi Masuda, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 688,935, Jan. 4, 1985. This application Oct. 3, 1986, Ser. No. 915,952
Claims priority, application Japan, May 10, 1984, 59-94066
Int. Cl.[4] H04M *1/26*
U.S. Cl. 379—354 **5 Claims**



1. A telephone having a memory for storing telephone numbers and proper names related to each telephone number, and input means for introducing said telephone numbers and proper names into said memory, an improvement in said input comprising:

keyboard mens including a plurality of keys consisting only of numeric keys and function keys;

display means for displaying information input by said keys;

said memory having stored therein alphabetic character data capable of generating all characters of an alphabet from which said proper names shall be formed;

nonactuable indicia adjacent a portion of said display means including a side-by-side array of numbers corresponding to each of the numbers of said numeric keys;

selection means for retrieving from said memory alphabetic characters data for generating on said display means selected groups of characters from the alphabet, the number of characters in said group being no greater than the number of side-by-side numbers in said array, said display means displaying the selected group on said portion of said display means in visual alignment with said numbers on said array in a one-to-one correspondence therewith, said nonactuable indicia permitting cross-referencing between said portion of said display means and said key having the number corresponding to the indicia; and

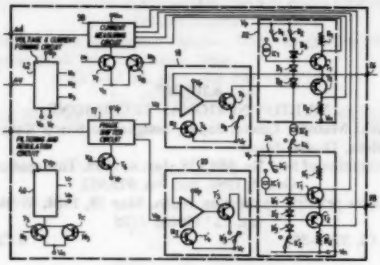
control means for inputting a selected alphabetic character from the selected group into said memory in response to actuation of the numeric key bearing the number in said array which is aligned in one-to-one correspondence with the selected alphametic character in the group of characters displayed on said adjacent portion of the display means.

4,709,388

SUBSCRIBER TELEPHONE LINE INTERFACE CIRCUIT WITH REDUCED POWER STAND-BY MODE

Bruno Defretin, St. Egreve, France, assignor to Thomson-CSF, Paris, France

Filed Feb. 12, 1986, Ser. No. 828,691
Claims priority, application France, Feb. 15, 1985, 85 02249
Int. Cl.[4] H04M *19/00*
U.S. Cl. 379—413 **2 Claims**



1. A subscriber telephone line interface circuit comprising first and second amplifiers of signals to be transmitted respectively to first and second subscriber line conductors, each amplifier having an input stage and an output stage, each output stage comprising first and second push-pull connected transistors connected to respective line conductors and supplied between first and second supply potentials common to the two output stages, said interface circuit further comprising a means for measuring the current in the line and a terminal for receiving a stand-by signal indicating that the circuit is to be placed in stand-by mode with a low power consumption, further comprising, responsive to reception of the stand-by signal:

means for biasing the transistors of the output stages so as to establish a fixed potential difference between the line conductors connected to the transistors of the output stages;

means for disconnecting the input stages from the output stages; and

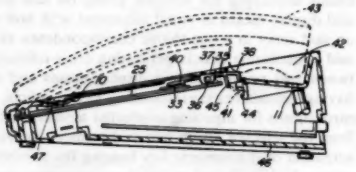
means for discontinuing the power supply for most of the elements of the circuit but not for the push-pull transistors of the output stages or the line current measuring circuit.

4,709,389

TELEPHONE HOOK SWITCH WITH ELASTOMERIC CONTACT MEMBER

Anthony J. Langenberg, Kanata; Pak-Jong Chu, Nepean; John S. Moss, and Geoffrey A. Collar, both of Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Mar. 18, 1985, Ser. No. 713,441
Int. Cl.[4] H04M *1/08*
U.S. Cl. 379—424 **1 Claim**



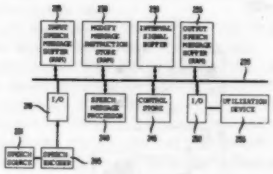
1. A telephone set base having a bottom housing and a cover, a pushbutton dial assembly in said cover and a recess in said cover for reception of a transducer housing of a telephone handset; said pushbutton dial assembly comprising a circuit board having a circuit pattern on an upper surface, said circuit pattern including a plurality of switch positions, a switch position for each pushbutton and also including a further switch position for a hook switch; an elastomeric member positioned over said circuit board and including a plurality of deformable contact members, a contact member aligned with each switch position; a further deformable contact member aligned with said further switch positions; a hook switch actuating member having opposite ends and being pivotally mounted on said cover at a position intermediate its ends, said actuating member including a first lever extending on one side of the pivotal axis of the actuating member in a direction normal to said pivotal axis and having an end positioned over said further deformable contact member, and a second lever extending on the other side of said pivotal axis in a direction normal to said pivotal axis, said second lever extending into said recess in said cover; biasing means resiliently biasing said actuating member whereby said first lever is urged toward said circuit board and to depress said further deformable contact member and said second lever extends above a bottom surface of said recess, the arrangement such that on positioning the transducer housing in said recess, said second lever is depressed to pivot said actuating member and move said first lever away from said circuit board and free said further deformable contact member.

4,709,390

SPEECH MESSAGE CODE MODIFYING ARRANGEMENT

Bishnu S. Atal, New Providence, and Barbara E. Caspers, Saddle River, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 4, 1984, Ser. No. 607,164
Int. Cl.[4] G10L *5/00*
U.S. Cl. 381—51 **22 Claims**



1. Apparatus for coding a speech pattern comprising:

means for partitioning said speech pattern into successive time frame portions;

means responsive to each successive time frame portion of the speech pattern for generating speech parameter signals comprising a set of linear predictive parameter type spectral representative signals and an excitation signal comprising a sequence of excitation pulses each of amplitude beta and location m within said time frame;

means responsive to the frame speech parameter signals for identifying successive intervals of said speech pattern as voiced or other than voiced, each voiced interval being a plurality of time frame portions coextensive with a pitch period of said speech pattern and each other than voiced interval comprising a time frame portion of said speech pattern; and

means for modifying the excitation signals of each successive identified voiced interval to compress the speech pattern excitation signals of said speech pattern;

said modifying means including:

means responsive to each other than voiced interval for forming an excitation signal comprising the sequence of excitation pulses of the time frame portion of the other than voiced interval;

means responsive to the occurrence of a succession of identified voiced intervals for forming an excitation signal comprising the sequence of excitation pulses of the pitch period of a selected one of said succession of identified voiced intervals; and

means for forming an excitation signal for each of the remaining voiced intervals of said succession of identified voiced intervals comprising a coded signal repeating the sequence of excitation signals of the pitch period of said selected identified voiced interval.

4,709,391

ARRANGEMENT FOR CONVERTING AN ELECTRIC SIGNAL INTO AN ACOUSTIC SIGNAL OR VICE VERSA AND A NON-LINEAR NETWORK FOR USE IN THE ARRANGEMENT

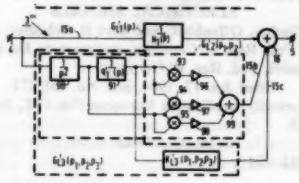
Adrianus J. M. Kaizer, Eindhoven, and Gerrit H. Van Leeuwen, Heerlen, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 30, 1985, Ser. No. 739,579

Claims priority, application Netherlands, Jun. 8, 1984, 8401823

Int. Cl.⁴ H03G 5/00

U.S. Cl. 381—98 **12 Claims**



1. An arrangement having a transducer for converting electrical energy into acoustic energy or which converts acoustic energy into an electrical signal, said transducer producing further linear and higher order non-linear distortion products during conversion of one form of energy to another, a first circuit branch comprising a non-linear network connected to said transducer which compensates for at least one second or higher order distortion component contained in said non-linear distortion products, whereby the total distortion products are reduced, defined by the equation

$$G_2(p_1, p_2) = -\alpha H_2(p_1, p_2)/[H_1(p_1+p_2).H_1(p_1).H_1(p_2)],$$

wherein $H_2(p_1, p_2)$ is the Laplace transform of $h_2(t_1, t_2)$, being the second order response of the transducer to an input signal applied to the transducer, which signal is made up from two pulses which are time-shifted relative to each other, and a second circuit branch compensating for a first order distortion and having a transfer function $G_1(p)$ at least approximately corresponding to the inverse of the linear transfer function $H_1(p)$ of the transducer multiplied by a constant α, where $G_1(p) = \alpha/H_1(p)$.

4,709,392

DOME SPEAKER WITH A DIAPHRAGM HAVING AT LEAST ONE ELONGATED CUT-OUT PORTION

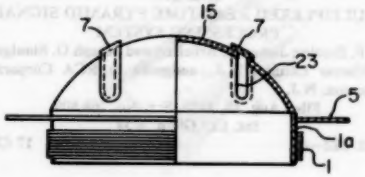
Toshiji Kato, and Tatsuya Omori, both of Hirakata, Japan, assignors to Onkyo Kabushiki Kaisha, Osaka, Japan

Filed Feb. 28, 1985, Ser. No. 706,512

Claims priority, application Japan, Mar. 8, 1984, 59-33872[U]; Mar. 9, 1984, 59-34748[U]; Mar. 9, 1984, 59-34749[U]; Mar. 14, 1984, 59-37168[U]; Jul. 3, 1984, 59-101190[U]; Jul. 3, 1984, 59-101191[U]

Int. Cl.⁴ H04K 7/02, 7/18, 7/24, 9/02

U.S. Cl. 381—193 **8 Claims**



1. A dome speaker comprising a dome-shaped diaphragm and a voice coil bobbin connected to the diaphragm, said diaphragm formed of a highly rigid material and having two elongated cut-out portions therein aligned in parallel relation to each other and having a center portion of said diaphragm interposed therebetween, wherein said cut-out portions vary the rigidity of the diaphragm and prevent a dip in the anti-resonance frequency range and a peak in the high resonance frequency range of the dome speaker.

4,709,393

VIDEO PROCESSING SYSTEMS

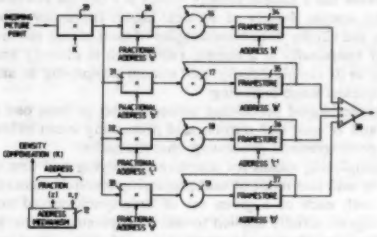
Richard J. Taylor, London; Paul R. N. Kellar, and Neil R. Hinson, both of Newbury, all of England, assignors to Quantel Limited, Kenley, England

Filed Mar. 16, 1983, Ser. No. 475,790

Claims priority, application United Kingdom, Mar. 19, 1982, 8208054

Int. Cl.⁴ G06K 9/00

U.S. Cl. 382—41 **14 Claims**



1. Apparatus for video picture manipulation comprising:

a source of input pixel values defining an input picture;

frame store means having respective storage locations for pixel values pertaining to respective pixels of a manipulated picture;

address means for generating a number of addresses of storage locations in the frame store means, which pertain to different pixels of the manipulated picture, for each of at least a selected multiplicity of input pixel values, and for generating a respective z-factor for each address;

processing means responsive to each given one of said input pixel values to generate, for each address generated for

the given input pixel value, a respective proportion of the pixel value which is determined by the z-factor generated for that address, and for causing the frame store means to store said proportions in the respective addressed storage locations; and

means for reading out the contents of the storage locations in the frame store means to form therefrom output pixel values defining a manipulated picture;

wherein the pixel value proportions generated for each given address location are accumulated to form an output pixel value corresponding to that storage location.

4,709,394

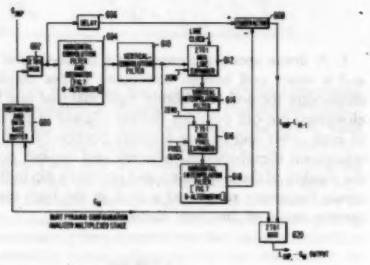
MULTIPLEXED REAL-TIME PYRAMID SIGNAL PROCESSING SYSTEM

Roger F. Bessler; James H. Arbeiter, and Joseph O. Sinniger, all of Mercer County, N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Aug. 23, 1985, Ser. No. 768,809

Int. Cl.[4] G06K *9/54*

U.S. Cl. 382—49 **17 Claims**



1. A time-synchroniuzed system for converting in delayed real time a first sample temporal signal into a second sampled temporal signal, wherein the samples comprising said first signal define an n-dimensional information component, where n is a given integer of at least one, and the samples comprising said second signal define each of a given plural number of separate frequency subs-pectra of the frequency spectrum of said n-dimensional information component, in which (1) each of the sub-spectra below that of the highest-frequency sub-spectrum has a sample density which is a certain sub-multiple of the sample density of its next-higher-frequency subspectrum, and (2) the respective samples of each of said sub-spectra occur temporally at a sample rate which is directly proportional to its sample density; said system comprising an anlyzer multiplexed stage including:

sampled-signal processing means having at least one input and at least one output, said processing mean exhibiting predetermined processing characteristics;

multiplexing means for selectively applying said first signal to said one input of said processing means in accordance with each of a given set of time-synchronized control signals serially applied to said multiplexing means; and

means for repetitively generating ssaid given set of control signals and serially applying them to said multiplexing means;

wherein said predetermined processing characteristics exhibited by said processing means are such as to derive said signal as an output of said multiplexed stage after a number of repetitive generations of said set of control signals that is a linear function of said given plural number of sub-spectra;

wherein said processing means comprises means forming a first part of a closed loop and including a data rate buffer for writing into storage, in said buffer, decimated samples of each of respective sample groups that have been decimated in each of said n dimensions, each of said sample group having a separate one of said sub-spectra corresponding thereto, thereby resulting in stored decimated samples of all said sample groups in said buffer;

wherein said multiplexing means includes first means forming a second part of said closed loop for reading out as buffer output from said buffer the stored decimated samples of all said sample groups but the sample group corresponding to a lowest-frequency one of the sub-spectra, with said readout samples of said respective sample groups in said buffer output being arranged in a predetermined temporal order format that has been determined in accordance with each of the repetitive sets of control signals, and a 2 to 1 multiplexor (MUX) forming a third part of said closed loop and having said first signal applied as a first input thereto and said buffer output applied as a second input thereto for combining in a certain temporal order respective samples of said first signal and said buffer output into a first single serial stream output of samples, said first single serial stream output of sample from said MUX being applied to said one input of said processing means;

wherein said means including said buffer further comprises convolution filter means for filtering said first single serial stream of samples applied to said one input of said processing means in each of said n dimensions to provide a second single serial stream of convolution filtered samples that are applied to said data rate buffer for use in the writing into storage of said decimated samples of said respective sample groups into storage;

wherein said means including said buffer provides said decimation in each of said n dimensions at at least one point thereof situated between said one input of said processing means; and

wherein said decimated samples of said respective sample groups are written into storage in said buffer.

4,709,395

METHOD AND APPARATUS FOR MINIMIZING ERRORS IN THE DIGITAL PROCESSING OF ELECTRICAL SIGNALS

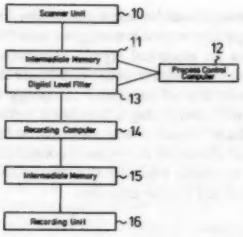
Gerhard Fischer, Offenbach, and Karl R. Scheuter, Darmstadt, both of Fed. Rep. of Germany, assignors to Dr.-Ing. Rudolf Hell GmbH, Fed. Rep. of Germany

Filed Jul. 17, 1984, Ser. No. 631,772

Claims priority, application European Pat. Off., Jul. 29, 1983, 83107477.8

Int. Cl.[4] G06K *9/40*

U.S. Cl. 382—54 **13 Claims**



1. A method for minimizing errors in digital processing of electrical signals, comprising the steps of:

transforming digital input signals into digital useful signals and associated digital error signals, each of the digital useful signals having a lower resolution than the corresponding input signal, and said error signal indicating deviation of the useful signal from the input signal;

defining a group of digital useful signals and adding together the corresponding digital error signals to create an error sum;

checking whether the error sum crosses a prescribed upper or lower threshold;

if the threshold is crossed, changing the value of one of the digital uesful signals of said group, redetermining the digital error signal corresponding to said changed useful signal, and recalculating the error sum by adding together the digital error signal of the group; and

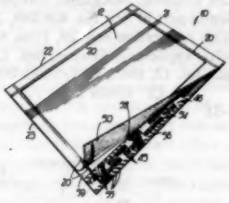
rechecking to see whether the error sum crosses the upper or lower threshold.

4,709,396

TAMPER-EVIDENT ENVELOPE WITH INDICIA UNDERLYING COHESIVE LAYERS

Donald K. Voshall, Dunwoody, and Danny K. Strickland, Jackson, both of Ga., assignors to John H. Harland Company, Decatur, Ga.

Filed Dec. 24, 1985, Ser. No. 813,037
Int. Cl.[4] B65D 27/14
U.S. Cl. 383—5 **9 Claims**



1. A tamper-evident envelope, comprising:

(a) a pouch formed from at least one sheet of impact resistant material, having a plurality of edges sealed along all but one remaining edge;

(b) said remaining edge defining an access opening through which items can be placed into said pouch;

(c) said remaining edge having upper and lower inner surfaces;

(d) said upper inner surface being covered with a translucent anchor coating;

(e) said lower inner surface being covered with said translucent anchor coating in a pattern bearing characteristic indicia;

(f) said anchor coating on said lower inner surface being interrupted by predetermined void regions; and

(g) said anchor coatings each being covered with a translucent cohesive layer, so that when said cohesive layers of said remaining edge are pressed together, a translucent seal closing the pouch and obscuring the indicia is formed,

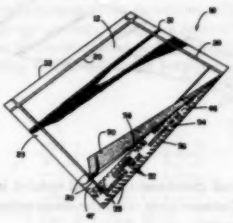
wherein said cohesive layers have a greater affinity for each other than for the anchor coating and have a greater affinity for the anchor coating than for said void regions, so that said cohesive layer covering the anchor coating on the lower inner surface is pulled away from the anchor coating containing void regions to reveal said indicia, when said inner surfaces are separated after being cohesively sealed.

4,709,397

TAMPER-EVIDENT ENVELOPE WITH INDICIA-FORMING COHESIVE LAYERS

Donald K. Voshall, Dunwoody, and Danny K. Strickland, Jackson, both of Ga., assignors to John H. Harland Company, Decatur, Ga.

Continuation-in-part of Ser. No. 813,037, Dec. 24, 1985. This application May 16, 1986, Ser. No. 863,835
Int. Cl.[4] B65D 27/14
U.S. Cl. 383—5 **12 Claims**



1. A tamper-evident envelope, comprising:

(a) a pouch formed from at least one sheet of impact resistant material, said pouch having a plurality of edges sealed along all but one remaining edge;

(b) said remaining edge defining an access opening through which items can be placed into said pouch:

(c) said remaining edge having upper and lower inner surfaces;

(d) said upper inner surface being covered with a translucent upper anchor coating, and said lower inner surface being covered with a translucent lower anchor coating;

(e) said upper anchor coating being covered with a cohesive layer;

(f) said lower anchor coating being covered with said cohesive layer in a predetermined pattern bearing characteristic indicia, so that when said cohesive layers of said remaining edge are pressed together, a translucent seal closing the pouch is formed obscuring said characteristic indicia;

(g) said cohesive layer on the lower inner surface being interrupted by predetermined void regions, said void regions defining said indicia which convey a message that the seal has been broken; and

(h) said cohesive layers having a greater affinity for each other than for the anchor coatings and the affinity between said interrupted cohesive layer on said lower surface and said anchor coating being less than the affinity between said non-interrupted cohesive layer on said upper surface and said anchor coating, so that said cohesive layer covering said anchor coating on said lower inner surface is pulled away from said anchor coating to reveal said indicia when said inner surfaces are separated after being cohesively sealed,

whereby any attempt to break said translucent seal results in the disruption of said cohesive layers and said anchor coatings causing said characteristic indicia to be revealed.

4,709,398

CHAIN BAGS, METHOD AND APPARATUS

Steven Ausnit, New York, N.Y., assignor to Minigrip, Inc., Orangeburg, N.Y.

Filed Jan. 7, 1987, Ser. No. 1,050
Int. Cl.[4] B65D 33/16
U.S. Cl. 383—63 **16 Claims**

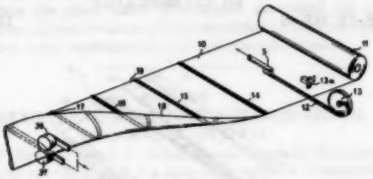
1. A method of manufacture of reclosable bags comprising the steps:

applying a plurality of fastener strips each closable on itself

laterally across the width of a continuous sheet of film at predetermined spaced intervals;

folding the film upon itself so that the opposed lateral edges are in alignment and with the fastener strips doubled and interlocking;

forming a seam joining said lateral edges to complete a body for bags;



forming lateral cross-seams at said spaced intervals spaced from the fastener strip with the cross-seam providing bag bottom seams;

and forming a line of weakened tear resistance at said spaced intervals located between each of the fastener strips and said bottom seam so that individual bags can be removed from the strip.

4,709,399

OPENING FACILITATING CLOSURE TAPE AND CONTAINER

Bernard Sanders, Jersey, Channel Islands, assignor to Beiersdorf A.G., Hamburg, Fed. Rep. of Germany

Continuation of Ser. No. 644,174, Aug. 23, 1984, abandoned. This application Nov. 13, 1986, Ser. No. 928,718

Claims priority, application United Kingdom, Aug. 25, 1983, 8322885

Int. Cl.[4] B65D *33/20*

U.S. Cl. 383—66 **3 Claims**

1. An easily openable container comprising a panel having an elongate opening location and a tape applied by a pressure sensitive contact adhesive to a surface of said panel so as to bridge the opening location, said tape and said adhesive being of greater dimension than the opening location so as to provide a substantially airtight closure and the adhesive being re-usable such that the tape is separately unitable in a controlled manner with the surface of the panel, said container including means for allowing said tape to be peeled from said surface in a transverse direction of the opening location and the tape to release and separate from the adhesive only as far as the opening location so that the continued movement in the transverse direction causes opening of the container at the opening location.

4,709,400

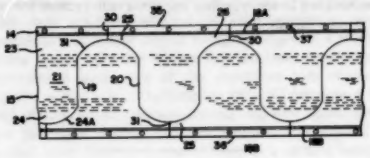
PRODUCE BAG WITH TIE TAILS

Edward C. Bruno, 15336 Penwood Pl., Aurora, Colo. 80015

Filed May 22, 1986, Ser. No. 865,753

Int. Cl.[4] B65D *33/16*

U.S. Cl. 383—77 **8 Claims**



1. A plastic bag including two panels of pliable plastic film heat sealed along the periphery to define a body portion, a closed bottom and substantially parallel sides and having an open top, said open top of said bag being of relatively wider diameter than said body portion, portions of said panels extending outwardly from said sides adjacent the upper edges of said sides to define integral ties on opposite sides of said opening.

4,709,401

METHOD OF SETTING RADIO TRANSMITTERS FOR SYNCHRONOUS RADIO TRANSMISSION

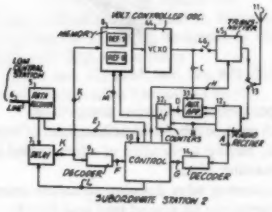
Dag E. Akerberg, Jarfalla, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

Continuation-in-part of Ser. No. 626,868, Jun. 29, 1984, abandoned. This application Sep. 29, 1986, Ser. No. 912,983

Claims priority, application Sweden, Sep. 12, 1982, 8207054; PCT Int'l Appl., Jul. 12, 1983, PCT/SE83/00435

Int. Cl.[4] H04B *1/00, 7/14*

U.S. Cl. 455—51 **2 Claims**



1. In a transmission system having a central radio station and a plurality of other radio stations connected by lines to the central station, wherein each of the stations includes a transmitter for transmitting to receiving devices, the method of setting, before transmission by a plurality of the radio stations of messages generated by the central station, for synchronizing the operation of a first of said other stations to a second of said other stations at least comprising the steps of:

the central station sending on lines to said first and second other stations an order message to set for simultaneous transmission, each of said first and second other stations noting the time of receipt of said order message, said second other station radio transmitting said order message a first given period of time after the receipt thereof, said first other station noting and storing the time of arrival of said order message over the air from said second other station, said first station establishing the delay time of transmission over the air of a subsequent message received on a line, said established delay time being the difference between the time of reception via the line of said order message from the central station and the time of reception

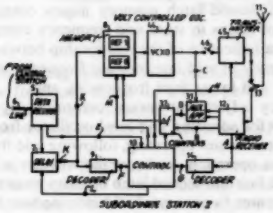
of said order message over the air from the second other station less the propogation time, stored in the first other station, for a message to be transmitted over the air from said second other station to said first other station.

4,709,402

METHOD OF SYNCHRONIZING RADIO TRANSMITTERS FOR SYNCHRONOUS RADIO TRANSMISSION

Dag E. Akerberg, Jarfalla, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

Continuation-in-part of Ser. No. 626,867, Jun. 29, 1984, abandoned. This application Oct. 22, 1986, Ser. No. 921,740
Claims priority, application Sweden, Sep. 12, 1982, 8207043; PCT Int'l Appl., Jul. 12, 1983, PCT/SE83/00436
Int. Cl.[4] H04B *1/00*; G08S *5/22*
U.S. Cl. 455—51 **6 Claims**



1. In a radio communication system having a central radio station connected by lines to a plurality of other radio stations for transmitting messages to receivers, the method of controlling the transmitting frequency of the carrier signal of a first of the other radio stations to have a given relationship with the transmitting frequency of the carrier signal of a second of the radio stations comprising the steps of the central station sending on the lines to the first and second other radio stations order messages for ordering said other radio stations to adjust the transmitting frequencies of their carrier signals, the second other radio station in response to the receipt of said order message transmitting with its own transmitting frequency said order message over the air to said first other radio station,

said first other radio station in response to the receipt of said order message on a line from the central station being activated to receive over the air messages from the second radio station,

said first radio station comparing the transmission frequency of the order message received over the air from the second other radio station with its own carrier signal's transmission frequency, said comparing step comprising counting a number of cycles of a signal derived from the order message received from the second radio station, counting a number of cycles of a signal derived from its own carrier frequency and comparing the counts, and

said first radio station adjusting its own carrier signal's transmission frequency in accordance with the results of the comparision.

4,709,403

APPARATUS FOR CONTROLLING OUTPUT POWER OF TRANSMITTER

Jiro Kikuchi, Soma, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Mar. 14, 1986, Ser. No. 840,323
Claims priority, application Japan, Mar. 14, 1985, 60-51302
Int. Cl.[4] H04B *1/04*; H03G *3/00*
U.S. Cl. 455—126 **2 Claims**

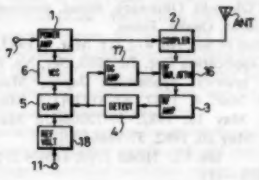
1. An apparatus for controlling the output power of a transmitter, comprising:

a power amplifier for amplifying RF signals to be transmitted and delivering output signals to be transmitted;

a coupler receiving the output of said power amplifier and providing to an antenna the output signals having an output power to be transmitted and a feedback signal indicating the output power of the output signals;

a detector connected to receive the feedback signal from said coupler for detecting the output power of the output signals and providing a detection voltage corresponding thereto;

a comparator receiving the detection voltage from said detector for comparing said detection voltage to a reference voltage set corresponding to a desired level of output power to be transmitted, and providing a difference signal corresponding to the difference between said voltages;



a voltage control circuit receiving the difference signal from said comparator for controlling a power supply to said power amplifier in accordance with the difference signal, whereby the output power of the output signals can be maintained constant at a desired level; and

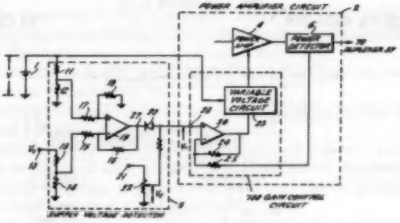
a subloop including an RF variable attenuator connected between the feedback signal output of said coupler and the input to said detector and receiving as an input the detection voltage of said detector, whereby the feedback signal of said coupler is variably attenuated according to the output voltage from said detector so that the dynamic range of said comparator is equivalently increased and the necessity for setting a maximum amount of attenuation for said attenuator is avoided.

4,709,404

BATTERY-POWERED RADIO COMMUNICATION APPARATUS CAPABLE OF PROLONGING THE COMMUNICABLE STATE THEREOF

Yoshiharu Tamura, and Katsuji Kimura, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Aug. 13, 1985, Ser. No. 765,358
Claims priority, application Japan, Aug. 14, 1984, 59-168852
Int. Cl.[4] H04B *1/04*; H03F *3/04*
U.S. Cl. 455—126 **12 Claims**



1. A radio communication apparatus comprising:

power amplifier means for amplifying an input signal;

battery means for supplying power to said power amplifier means;

automatic gain control circuit means for maintaining the output power of said power amplifier means at a first predetermined level in response to the output of said power amplifier means and decreasing the output power of said power amplifier means to a second predetermined level in response to a control signal, said second predetermined level being lower than said first predetermined level; and

comparing means for comparing the output voltage of said battery means with a standard voltage and supplying the resultant to said automatic gain control circuit means as said control signal, when the output voltage of said battery means falls below said standard voltage.

4,709,405

CHANNEL SELECTING PANEL HOLDER FOR TELEVISION SET

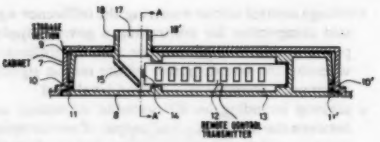
Masanori Okazaki, Ohtawara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 472,271, Mar. 4, 1983, abandoned. This application Dec. 20, 1985, Ser. No. 810,846

Claims priority, application Japan, Mar. 4, 1982, 57-31238[U]; Mar. 4, 1982, 57-31239[U]; May. 18, 1982, 57-73005[U]; May 18, 1982, 57-73006[U]; May 18, 1982, 57-73007[U]; May 20, 1982, 57-74664[U]

Int. Cl.[4] H04B *1/08*; H04N *5/64*

U.S. Cl. 455—151 **3 Claims**



3. A television set comprising:

transmitter means for sending signals to a receiving unit;

operating means for removably storing said transmitter means, said operating means being rotatably mounted in a storage section of the television set in order to be movable between an open and a closed state; and

a tubular reflection element for reflecting said signals as they are sent by said transmitter means to said receiving unit, said tubular reflection element being mounted on said operating means and being rotatable therewith.

4,709,406

A.F.C. SYSTEM FOR BROAD-BAND FM RECEIVER

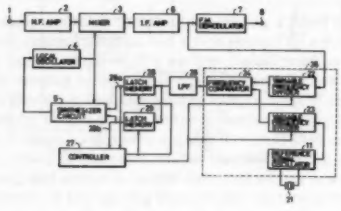
Noriaki Omoto, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Sep. 18, 1986, Ser. No. 908,897

Claims priority, application Japan, Sep. 19, 1985, 60-206824; Sep. 19, 1985, 60-206825

Int. Cl.[4] H04B *1/16*

U.S. Cl. 455—208 **14 Claims**



1. An automatic frequency control system for performing correction of a frequency error of a center frequency of a frequency-modulated intermediate frequency signal with respect to a predetermined intermediate frequency value such as to hold the magnitude of said frequency error within a predetermined frequency error range, for a frequency modulation receiver system including local oscillator circuit means for producing a local oscillator signal and a frequency mixer coupled to receive said local oscillator signal for producing said frequency-modulated intermediate frequency signal, said automatic frequency control system comprising:

control means:

frequency comparison means controlled by said control means to selectively operate in a first status for comparing said center frequency of said intermediate frequency signal with an upper limit frequency of said frequency error range and in a second status for comparing said center frequency of said intermediate frequency signal with a lower limit of said frequency error range, and for producing a frequency comparison signal indicative of results of said frequency comparisons;

first and second latch memory means controlled by said control means to store said frequency comparison signal as data indicative of the relationship between said center frequency of said intermediate frequency signal and said upper and lower limit frequencies, and;

frequency adjustment means controlled by said control means for adjusting said local oscillator frequency;

said control means operating, following said frequency comparison operation, to determine whether said data stored in said first and second latch memory means indicates that said center frequency of said intermediate frequency signal is within said frequency error range, and operating when said center frequency is determined to be within said frequency error range to execute successively alternating comparisons of said center frequency of said intermediate frequency signal with said upper and lower limits respectively by said frequency comparison means, and to store the level of said frequency comparison signal in said first latch memory means following a comparison of said center frequency of said intermediate frequency signal with said upper limit frequency and to store the level of said frequency comparison signal in said second latch memory means following a comparison of said center frequency of said intermediate frequency signal with said lower limit frequency, said control means further operating, when said center frequency of said intermediate frequency signal is determined to be outside said frequency error range as indicated by said data stored in said first and second latch memory means, to control said frequency adjustment means such as to adjust said local oscillator frequency to bring said center frequency of said intermediate frequency signal within said frequency error range.

4,709,407

BAND DISCRIMINATING METHOD IN A RECEIVER

Yoshihiko Baba, Noda, Japan, assignor to Uniden Corporation, Ichikawa, Japan

Filed Oct. 1, 1985, Ser. No. 782,566

Claims priority, application Japan, Nov. 5, 1984, 59-231288

Int. Cl.[4] H04B *17/00, 1/26*

U.S. Cl. 455—226 **3 Claims**

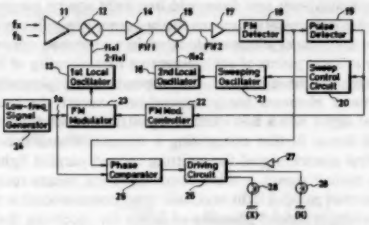
1. A method for discriminating received radar signals which belong respectively to first and second frequency bands in upper and lower-heterodyne reception modes and can be converted to the same second intermediate frequency signal in a harmonic mixing circuit, said received radar signals being discriminated between said first and second frequency bands when they are detected through said second intermediate frequency signal, which method comprises the steps of:

mixing in a first mixer the received radar signals with first local oscillating frequencies of a first fixed fundamental oscillating frequency and the second harmonic frequency being twice as high as said fundamental oscillating fre-

quency, thereby to produce a first intermediate frequency as a heat signal;

mixing in a second mixer said first intermediate frequency with a second local oscillating frequency adapted to sweep a prescribed freqency band, thereby to produce a second intermediate frequency as a beat signal;

detecting the reception of the radar signal in accordance with said second intermediate frequency;



frequency-modulating said first local oscillating frequencies with a low frequency signal for a fixed period after said received radar signal is detected;

subjecting said second intermediate frequency to FM detection; and

determining in which frequency band the received radar signal falls in accordance with the difference between the phase relationships of said FM-detected second intermediate frequency and said low frequency signal.

4,709,408

PHASED LOCK LOOP SYNCHRONOUS DETECTING SYSTEM WITH AN AUTOMATIC FREQUENCY TUNING CIRCUIT

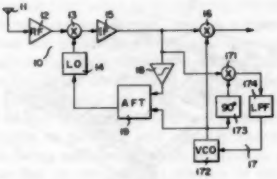
Tetsuro Itakura; Yoshitaka Kasagi; Mikio Koyama, and Chikashi Nakagawara, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 31, 1985, Ser. No. 760,984

Claims priority, application Japan, Sep. 29, 1984, 59-204846

Int. Cl.[4] H04B *1/16*

U.S. Cl. 455—260 **10 Claims**



1. A phase locked loop synchronous detecting system with an automatic frequency tuning circuit, said system comprising:

means for generating a high frequency signal including a carrier component and a signal component to be synchronously detected;

local oscillator means for generating a local oscillation signal according to a supplied frequency tuning signal;

mixing means for receiving said high frequency signal from said generating means and said local oscillation signal from said local oscillator means, and for generating a predetermined intermediate frequency signal including said carrier component and said signal component to be synchronously detected;

intermediate frequency signal amplifier means for receiving and amplifying said intermediate frequency signal from said mixing means to produce an amplified intermediate frequency signal;

limiter means for receiving said amplified intermediate frequency signal and outputting a signal indicative of said carrier component of said intermediate frequency signal;

a phase locked loop circuit including: (a) phase comparator means for receiving, as a phase comparison reference signal, one of said intermediate frequency signal from said intermediate frequency signal amplifier means and said carrier component from said limiter means; (b) a first low-phase filter for receiving an output of said phase comparator means and producing a low pass filtered output; (c) voltage-controlled oscillator means for receiving said output of said first low-pass filter means, and for oscillating an output signal having substantially the same frequency as said intermediate frequency signal; and (d) first 90° phase shifter means for receiving said output signal of said voltage-controlled oscillator means to produce a 90° phase-shifted signal and for supplying said 90° phase-shifted signal to said phase comparator means to be compared with said phase comparison reference signal;

synchronous detector means for receiving said amplified intermediate frequency signal from said intermediate frequency signal amplifier means and said output signal from said voltage controlled oscillator means, and for generating a synchronous detection signal; and

automatic frequency tuning means for receiving said carrier component from said limiter means and said output signal from said voltage-controlled oscillator means, and supplying a signal, corresponding to a frequency difference between said carrier component and said output signal from said voltage-controlled oscillator means, to said local oscillator means as said automatic frequency tuning signal.

4,709,409

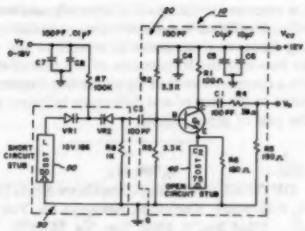
TVRO RECEIVER WITH SURFACE MOUNTED HIGH FREQUENCY VOLTAGE-CONTROLLED OSCILLATOR

John Y. Ma, 499 Dundee Ave., Milipitas, Calif. 90535, and Leo Wu, 1507 Oak Canyon Dr., San Jose, Calif. 95120

Filed Aug. 25, 1986, Ser. No. 899,830

Int. Cl.[4] H04B *1/26*; H03B *5/12*

U.S. Cl. 455—325 **15 Claims**



5. An improved voltage controlled oscillator (VCO) capable of producing an oscillating output with a frequency bandwidth in the Gigahertz range, said oscillator comprising:

a dielectric substrate with a patterned metal layer on one side of the substrate, and

a surface-mounted oscillator on the patterned metal side of said substrate, said oscillator comprising:

amplifying means with regenerative feedback means to produce an oscillating output, said regenerative feedback means including an open-circuit-stub capacitance formed by said patterned metal layer, and

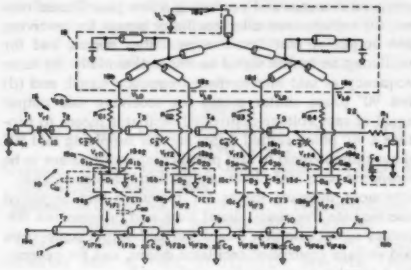
a controllable resonant circuit coupled to said amplifying means to control the frequency at which said output oscillates, said resonant circuit including a short-circuit-stub inductance formed by said patterned metal layer, at least one varactor diode in series with said short-circuit stub, and means for applying a controllable tuning voltage to said resonant circuit.

4,709,410

FREQUENCY CONVERSION CIRCUITS

Yusuke Tajima, Acton, and Robert A. Pucel, Needham, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Apr. 15, 1985, Ser. No. 723,377
Int. Cl.[4] H04B 1/28
U.S. Cl. 455—333 9 Claims



1. A radio frequency circuit having at least one output terminal comprising:

(a) a plurality of non-linear elements, each having an output electrode;

(b) means for feeding a pair of input signals each having a predetermined frequency to each one of said non-linear elements, said means further comprising:

(i) means, including at least one two port phase shifting element fed by at least one of the pair of input signals, for providing a plurality of signals portions, each one fed to a corresponding one of said plurality of non-linear elements, said signal portions having a successively increasing phase shift related to the electrical phase shift provided by the two port phase shifting element;

(c) interconnecting means, including at least one, different, two port phase shifting element, for successively electrically interconnecting the output electrode of each non-linear element; and

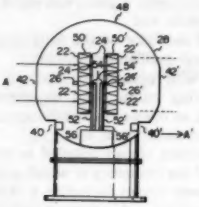
wherein in response to said pair of input signals, output signals are provided from each non-linear element to the output terminal having frequency components related to the sum of and difference between the frequencies of the pair of input signals to provide a composite output signal having frequency components related to the sum of and difference between the frequencies of the pair of input signals.

4,709,411

OPTICAL COMMUNICATION SYSTEM

Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan

Filed Jan. 4, 1984, Ser. No. 567,975
Claims priority, application Japan, Jan. 11, 1983, 58-2583; Jan. 31, 1983, 58-15101
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—601 6 Claims



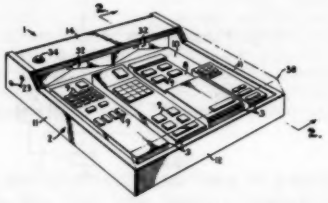
1. An optical communication system comprising a first communication means comprising a first light source means for emitting first parallel light rays as an optical signal, a second communication means receiving said first parallel light rays, said second communication means comprising first sensor means for sensing said first parallel rays emitted from said first light source means to cause said second communication means to automatically follow the direction of said first parallel light rays from said first light source means, said second communication means comprising a first plurlaity of lenses for receiving the optical signals sent from said first light source means, said second communication means further comprising first photoelectric transducer elements located in one-to-one correspondence at focal points of said respective first plurality of lenses, whereby output signals of the respective first photoelectric transducer elements are processed to convert the received optical signal into a first electric signal, said second communication means further comprising a repeater means driven by said first electric signal for emitting second parallel light rays as an optical signal, a third communication means receiving said second parallel light rays, said third communication means comprising a second plurality of lenses for receiving the optical signals sent from said repeater means, said third communication means further comprising second photoelectric transducer elements located in one-to-one correspondence at focal points of said respective second plurality of lenses, whereby output signals of the respective second photoelectric transducer elements are processed to convert the received optical signal into a second electric signal, and second sensor means on said third communication means for sensing said second optical signal sent out from said repeater means to cause said third communication means to automatically follow the direction of said second parallel light rays emitted from said repeater means.

4,709,412

REMOTE CONTROL UNIT INTEGRATOR CONSOLE

Herbert E. Seymour, Chatsworth, and Michael S. Robbins, Los Angeles, both of Calif., assignors to Xantech Corporation, Sylmar, Calif.

Filed Aug. 26, 1986, Ser. No. 900,540
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—603 22 Claims



1. An infrared remote control unit integrator console for housing a plurality of hand held infrared control transmitter units of not necessarily uniform size, shape, and coding scheme which are operable to selectively emit infrared signals toward infrared controlled appliances having respectively compatible infrared receivers associated therewith, said console comprising:

(a) console housing means sized to receive a plurality of infrared control transmitter units of not necessarily uniform size and shape therein; and

(b) infrared transfer means at least a portion of which is mounted within said housing means to receive an infrared signal from any infrared control transmitter unit positioned in said housing means and operatively transfer said infrared signal toward a respective infrared controlled

appliance to be controlled by said infrared control transmitter unit.

4,709,413

BIDIRECTIONAL FIBER OPTIC SYSTEMS

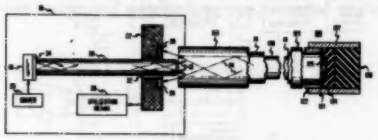
Stephen R. Forrest, Chatham; Robert A. Lieberman, New Providence, both of N.J., and Richard L. Panock, Lexington, Mass., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 653,885, Sep. 25, 1984, Pat. No. 4,577,209, which is a division of Ser. No. 416,467, Sep. 10, 1982, Pat. No. 4,493,113. This application Jun. 13, 1985, Ser. No. 744,465

The portion of the term of this patent subsequent to Jan. 8, 2002, has been disclaimed.

Int. Cl.[4] H04B *9/00*; C12M *1/34*; A61B *5/02*

U.S. Cl. 455—606 8 Claims



3. A bidirectional fiber optic sensing system comprising:

an optical transmission fiber;

a sensing element located at one end of said transmission fiber, said sensing element being adapted to reflect light in a manner related to an external variable to permit monitoring of said external variable; and

a transceiver coupled to the opposite end of said transmission fiber for transmission of outgoing radiation and detection of reflected radiation from said sensing element;

said transceiver including at least one semiconductor light-emitting device for generating said outgoing radiation;

said transceiver further including a photodiode having an active region of a first diameter and a first hole of a smaller second diameter extending through said photodiode in said active region, said active region being responsive to said reflected radiation for generating a signal photocurrent, and means for coupling said outgoing radiation through said first hole;

said transmission fiber being adapted to mix the modes of the radiation propagating therein, having a diameter much larger than that of said first hole, and hving one end positioned adjacent said active region so that said outgoing radiation is coupled through said first hole into said transmission fiber and said reflected radiation diverges from one end of said transmission fiber and is detected by said active region to produce said signal photocurrent, said first hole being sufficiently small relative to said active region so that an insignificant portion of said reflected radiation is coupled through said first hole.

4,709,414

OPTICAL FIBER ORDER WIRE SYSTEM

Vincent C. So; Paul J. Vella; David D. Clegg, and Richard P. Hughes, all of Edmonton, Canada, assignors to Northern Telecom Limited, Montreal, Canada

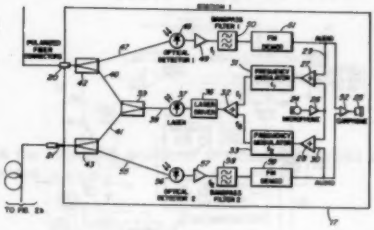
Filed Nov. 20, 1985, Ser. No. 799,833

Claims priority, application Canada, Jun. 12, 1985, 483730

Int. Cl.[4] H04B *9/00*

U.S. Cl. 455—607 7 Claims

1. A transceiver for use with an optical fiber communication system, comprising an audio input and an audio output, a first optical connector for connection of the transceiver to a downstream link of an optical fiber forming part of the communication system and a second optical connector for connection of the transceiver to an upstream link of the optical fiber, a first frequency modulator and a second frequency modulator both connected to the audio input, the first modulator operating at a first centre frequency f_1 and the second modulator operating at a second centre frequency f_2, a laser connected for modulation by both the first modulator and the second modulator and optically connected to both the first optical connector and the second optical connector, a first optical detector optically connected to the second optical connector and connected through a first filter means to a first frequency demodulator



having an output connected both to the audio output and to the first frequency modulator, the first filter means being arranged to pass frequencies substantially at f_1 and stop frequencies at f_2, a second optical detector optically connected to the first optical connector and connected through a second filter means to a second demodulator having an output connected to both the audio output and to the second frequency modulator, the second filter means being arranged to pass frequencies substantially at f_2 and stop frequencies at f_1.

4,709,415

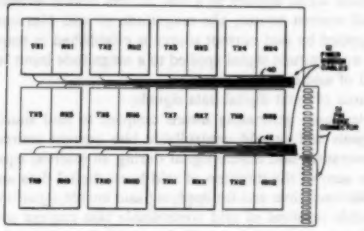
T-CARRIER FIBER OPTIC MODEM

John J. Prisco, West Chester, Pa., assignor to Warner Cable Communications, Inc., New York, N.Y.

Filed Nov. 14, 1986, Ser. No. 930,456

Int. Cl.[4] H04B *9/00*

U.S. Cl. 455—607 8 Claims



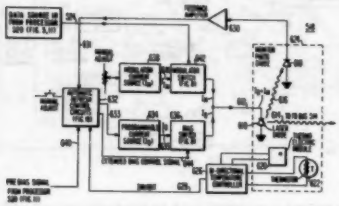
5. A T-carrier fiber optic modem comprising a T-carrier rack having N slots; M T-carrier office repeater cards being disposed in M respective slots, where M is less than N; each of said T-carrier repeater cards having a pair of transmit output terminals and a pair of receive input terminals; an additional card disposed in one of the remaining (N-M) slots of said rack; said additional card having M optical transmitters and M optical receivers; and a wiring pattern in said rack for connecting each of the M pairs of transmit output terminals to a respective one of said M optical transmitters and for connecting each of the M pairs of receive input terminals to a respective one of said M optical receivers.

4,709,416

LASER BIAS CURRENT STABILIZATION FOR BURST MODE FIBER OPTIC COMMUNICATION SYSTEM

David R. Patterson, Yardley, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Feb. 24, 1986, Ser. No. 832,537
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—609 **14 Claims**



1. A knee bias control circuit for a light emitting device, for a data transmitter adapted for burst communications in a local area fiber optic communications system, wherein said light emitting device has a light-versus-drive-current characteristic including a first portion in which the light emitted as a function of drive current increases relatively slowly from zero to a first level which occurs at a knee point, and also including a second portion in wich the light emitted as a function of drive current increases relatively quickly for drive currents exceeding the drive current correponding to said knee point, said ciruit comprising:

a controllable bias current source coupled to the light emitting device for applying bias current thereto, said controllable bias current source being enabled in response to an enable signal applied to a bias current enable terminal of said current source, the magnitude of said bias current supplied by said current source is established in response to a magnitude signal applied to a magnitude input terminal of said current source;

a source of burst digital data signals;

enable signal generating means coupled to said source of signals and to said controllable bias current source for generating said enable signal during an interval equal to the sum of the duration of said burst digital data and an additional time and for applying said enable signal to said enable terminal of said controllable bias current source, whereby bias signal is applied to said light emitting device during the time said burst digital data signals are transmitted but said bias current is not applied to said light emitting device during most of the time between bursts of said burst digital data signal, which reduces residual light in said local area fiber optic communications system and noise resulting therefrom; and

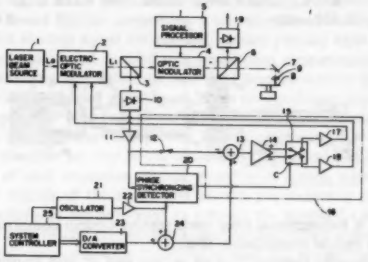
bias current setting means coupled to said enable signal generating means and to said controllable bias current source for generating said magnitude signal, for updating said magnitude signal during said additonal time and for applying said magnitude signal to said magnitude input terminal of said controllable bias current source, whereby said residual noise on said local area system is reduced, and the bias point of each data transmitter is reset without significant effect on the noise of the system.

4,709,417

OPTICAL MODULATION SYSTEM

Shinichiro Kuwabara, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 20, 1985, Ser. No. 811,820
Claims priority, application Japan, Dec. 21, 1984, 59-270488
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—611 **4 Claims**



1. An optical modulation system comprising:

an electro-optic modulator for modulating a laser beam in accordance with a modulation signal;

photo-electric transducing means for transducing a modulated laser beam derived from said modulator to an electrical signal;

an oscillator for generating an oscillation signal;

a phase synchronizing detector supplied with said electrical signal and said oscillation signal for detecting whether the phase of said electrical signal is in-phase or of opposite phase with respect to the phase of said oscillation signal; and

a control circuit having first and second means, said first means being supplied with said oscillation signal and an output of said photo-electric transducing means for providing a first modulation signal and a second modulation signal, said first and second modulation signals being opposite in phase, said second means being controlled by an output derived from said phase synchronizing detector to select one of said first and second modulation signals for connection to said modulator, whereby when the phase of said electrical signal is opposite in phase with respect to the phase of said oscillation signal, the other one of said first and second modulation signals is selected to be supplied to said modulator.

4,709,418

WIDEBAND CABLE NETWORK

John R. Fox; Edwin J. Powter, and William K. Ritchie, all of Suffolk, England, assignors to British Telecommunications public limited company, England

Filed Sep. 14, 1983, Ser. No. 532,100
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—612 **36 Claims**

1. An interactive wideband cable network comprising:

a central service position which can supply a plurality of

simultaneous fixed-time wideband services and at least one on-demand wideband service.

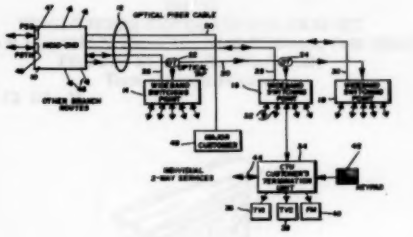
at least one passive tapped optical fibre connected to the central service position;

at least two wideband switches connected directly to said at least one passive tapped optical fibre;

connected to each wideband switch a plurality of wideband service receiving units, each said connection being made through individual wideband connections all of which have a both-way transmission capability; and

connected between the central service position and each wideband switch at least one additional optical fibre associated only with that switch;

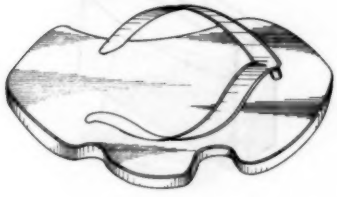
whereby each wideband service receiving unit can receive simultaneously a plurality of wideband services from the central service position, said plurality comprising at least one fixed-time wideband service received from the central position through the at least one tapped optical fibre and at least one on-demand wideband service requested to the central service position through the at least one additional optical fibre associated only with the wideband switch to



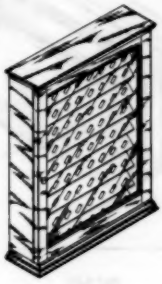
which the requesting wideband service receiving unit is connected.

292,840
SLEEVELESS VEST
Leo P. O'Brien, Sault Ste Marie, Canada, assignor to Frontier Survival Industries Ltd., Sault Ste Marie, Canada
Filed Oct. 11, 1984, Ser. No. 659,730
Claims priority, application Canada, Apr. 12, 1984, 12-04-84-7
Term of patent 14 years
U.S. Cl. D2—190

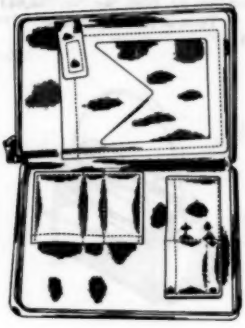
292,841
THONG
John D. Sexton, 28 Norfolk Street, and Alan M. Bourke, 32 Arlington Avenue, both of South Perth, Western Australia, Australia (6151)
Filed May 2, 1985, Ser. No. 729,805
Claims priority, application Australia, Feb. 22, 1985, 446/85
Term of patent 14 years
U.S. Cl. D2—270



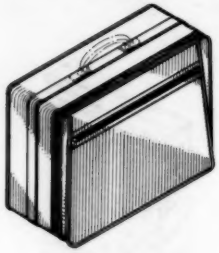
292,842
SINGLE DOOR THREAD SPOOL CABINET
John S. Lux, 5825 N. Haven Dr., North Highlands, Calif. 95660
Filed Jun. 21, 1985, Ser. No. 747,201
Term of patent 14 years
U.S. Cl. D3—25



292,843
CASE FOR A GOLF ACCESSORY KIT
Richard Frezza, P.O. Box 930, Bound Brook, N.J. 08805
Filed Jan. 28, 1985, Ser. No. 695,545
Term of patent 14 years
U.S. Cl. D3—37



292,844
LUGGAGE CASE
William H. Wilhoit, Newcastle, Pa., assignor to Airway Industries, Inc., Ellwood City, Pa.
Filed May 9, 1985, Ser. No. 732,061
Term of patent 14 years
U.S. Cl. D3—48

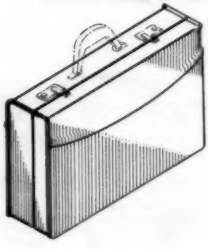


292,845
LUGGAGE CASE
Hyun S. Kim, Newcastle, Pa., assignor to Airway Industries, Inc., Ellwood City, Pa.
Filed Jun. 12, 1985, Ser. No. 744,042
Term of patent 14 years
U.S. Cl. D3—48

292,846
LUGGAGE CASE
Hyun S. Kim, Newcastle, Pa., assignor to Airway Industries, Inc., Ellwood City, Pa.
Filed Jun. 12, 1985, Ser. No. 744,043
Term of patent 14 years
U.S. Cl. D3—48

292,847
SHOULDER BAGS
R. Marshall Barker, 2901 Park Lake La., Norcross, Calif. 30092
Filed Mar. 4, 1985, Ser. No. 707,663
Term of patent 14 years
U.S. Cl. D3—52

292,848
ATTACHE CASE
Hyun S. Kim, Newcastle, Pa., assignor to Airway Industries, Inc., Ellwood City, Pa.
Filed May 8, 1985, Ser. No. 731,863
Term of patent 14 years
U.S. Cl. D3—76



292,849
SHOTGUN SHELL HOLDER
Paul Dickie, 52 Govett Ave.; David S. Baker, 12K Davies Lane, both of New Plymouth, New Zealand, and Donna Murta, 38928 Hills Creek Rd., Springfield, Oreg. 97478
Filed Mar. 4, 1985, Ser. No. 707,856
Term of patent 14 years
U.S. Cl. D3—100

292,850
HAIRBRUSH
Myron Glasberg, Needham, Mass., assignor to Brynel Incorporated, Avon, Mass.
Filed Sep. 27, 1985, Ser. No. 781,009
Term of patent 14 years
U.S. Cl. D4—128

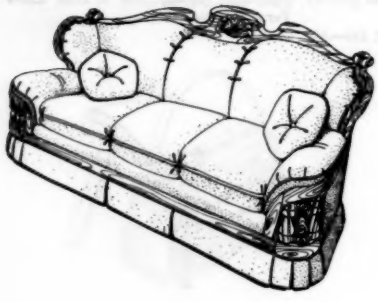
292,851
COMBINATION PICTURE DISPLAY AND STORAGE UNIT
Irene Krone, New York, N.Y., assignor to I. Krone Associates, Inc., New York, N.Y.
Filed May 8, 1984, Ser. No. 608,156
Term of patent 14 years
U.S. Cl. D6—300

292,852
CHAIR
Oddvin Rykken, Bygdøy Allé 12, 0262 Oslo 2, Norway
Filed Apr. 25, 1985, Ser. No. 727,239
Claims priority, application Norway, Nov. 6, 1984, 65692
Term of patent 14 years
U.S. Cl. D6—335

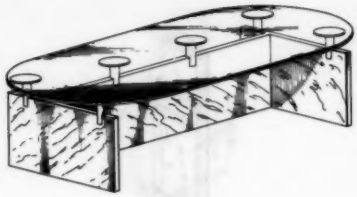
292,853
CHAIR
Peter Opsvik, Högtuveien 12, N-1370 Asker, Norway
Filed Apr. 25, 1985, Ser. No. 727,256
Claims priority, application Norway, Nov. 6, 1984, 65689
Term of patent 14 years
U.S. Cl. D6—335

292,854
SWIVEL ROCKER
Robert D. Vanderminden, Granville, N.Y., assignor to Telescope Casual Furniture Company, Granville, N.Y.
Filed Nov. 20, 1984, Ser. No. 673,347
The portion of the term of this patent subsequent to Jun. 2, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—366

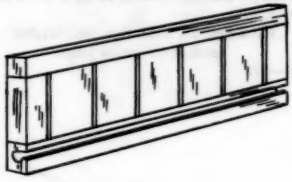
292,855
SOFA
Patrick Waldron, Turnersburg, N.C., assignor to Benchcraft, Inc., Blue Mountain, Miss.
Filed May 13, 1985, Ser. No. 733,201
Term of patent 14 years
U.S. Cl. D6—381



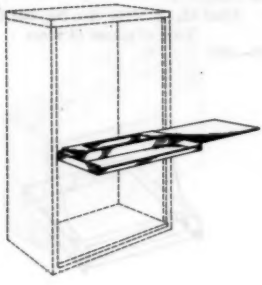
292,856
TABLE
Donald A. Jasinski, 2595 Ocean Blvd., Rye Beach, N.H. 03871
Filed Jun. 4, 1985, Ser. No. 741,231
Term of patent 14 years
U.S. Cl. D6—484



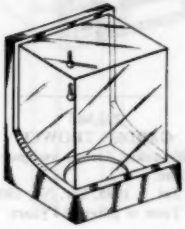
292,857
CABINET DOOR OR SIMILAR ARTICLE
Gary W. Gard, 6B Saddlebrook Way, Wesley Chapel, Fla. 34249
Filed Jun. 25, 1984, Ser. No. 624,020
Term of patent 14 years
U.S. Cl. D6—494



292,858
SHELF FOR COMPUTER KEYBOARD OR THE LIKE
David Wright, Shrewsbury, and Richard M. Latino, Holden, both of Mass., assignors to Wright Line Inc., Worcester, Mass.
Filed Feb. 4, 1985, Ser. No. 697,664
Term of patent 14 years
U.S. Cl. D6—511

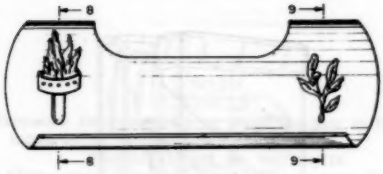


292,859
COMBINED TISSUE HOLDER AND DISPENSER OR THE LIKE
Danny K. Neumann, Ricks College Tr. Ct. #8, Rexburg, Id. 83440
Filed Dec. 7, 1985, Ser. No. 816,667
Term of patent 14 years
U.S. Cl. D6—518



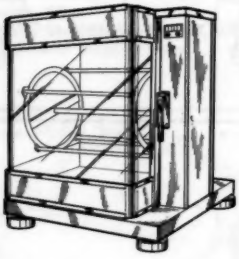
292,860
CLOSET SHELF
Kenneth F. Motta, 176 Mahogany Dr., Naples, Fla. 33963
Filed Feb. 19, 1985, Ser. No. 703,098
Term of patent 14 years
U.S. Cl. D6—566

292,861
KNIFE REST OR SIMILAR ARTICLE
Heinrich Dorper, Paderbornerstrasse 13, D-2800 Bremen 61, Fed. Rep. of Germany
Filed Jan. 22, 1985, Ser. No. 693,079
Claims priority, application Fed. Rep. of Germany, Jul. 27, 1984, 2684
Term of patent 14 years
U.S. Cl. D7—73



292,862
BARBEQUE
Wendy Flicker, Kingston-upon-Thames, and Richard Miles, Crowborough Hill, both of England, assignors to Prestige Group UK Plc, London, England
Filed Oct. 10, 1985, Ser. No. 786,283
Claims priority, application United Kingdom, Jul. 12, 1985, 1027895
Term of patent 14 years
U.S. Cl. D7—332

292,863
ROTISSERIE GRILL
Jan E. Johansson, Alingsås, Sweden, assignor to AB Electrolux, Sweden
Filed Dec. 23, 1985, Ser. No. 812,006
Claims priority, application Sweden, Aug. 8, 1985, 851927
Term of patent 14 years
U.S. Cl. D7—338

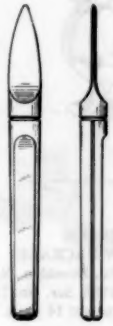


292,864
FRONT PANEL FOR A MICROWAVE OVEN
Takao Miyake; Nobuo Takaishi, and Mitsutaka Fuke, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Mar. 6, 1984, Ser. No. 586,846
Claims priority, application Japan, Sep. 6, 1983, 58-39187
Term of patent 14 years
U.S. Cl. D7—351

292,865
GARDEN TROWEL
Gary M. Scott, Milwaukie, Oreg., assignor to Wallace Mfg. Corp., Enfield, Conn.
Filed Jul. 1, 1985, Ser. No. 750,022
Term of patent 14 years
U.S. Cl. D8—10

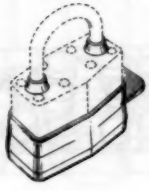
292,866
CAN OPENER
David J. Barnett, Hemel Hempstead, England, assignor to Mike & Kremmel Ltd, Kowloon, Hong Kong
Filed Apr. 23, 1985, Ser. No. 726,219
Claims priority, application United Kingdom, Oct. 24, 1984, 1022836
Term of patent 14 years
U.S. Cl. D8—41

292,867
LETTER-OPENER
Siegfried Hölterscheidt, Hückelhoven, Fed. Rep. of Germany, assignor to Walter Henkels GmbH, Fed. Rep. of Germany
Filed Apr. 2, 1985, Ser. No. 719,264
Claims priority, application Fed. Rep. of Germany, Jan. 7, 1985, MR 158
Term of patent 14 years
U.S. Cl. D8—102

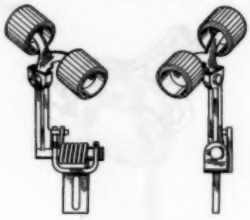


292,868
COMBINATION LOCK
Ching-Yuan Cheng, 64-5, Alley 70, Lane 419, Pei Tun Rd., Taichung, Taiwan
Filed Dec. 9, 1985, Ser. No. 806,604
Term of patent 14 years
U.S. Cl. D8—331

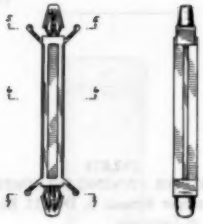
292,869
COVER AND SEAL UNIT FOR A PADLOCK
Horst Lebrecht, West Allis, Wis., assignor to Master Lock Company, Milwaukee, Wis.
Filed Feb. 7, 1985, Ser. No. 699,096
Term of patent 14 years
U.S. Cl. D8—346



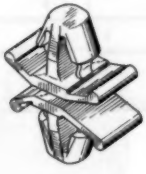
292,870
BOAT GUIDE ROLLER ASSEMBLY
Luigi Carbone, 938-942 Port Road, Woodville West, South Australia, Australia (5011)
Filed Mar. 5, 1985, Ser. No. 708,219
Term of patent 14 years
U.S. Cl. D8—354



292,871
SPACER
Yoshitoki Hayashi, Aichi, Japan, assignor to Kitagawa Industries Co., Ltd., Nagoya, Japan
Filed Jun. 3, 1985, Ser. No. 740,417
Claims priority, application Japan, Dec. 21, 1984, 59-52739
Term of patent 14 years
U.S. Cl. D8—354

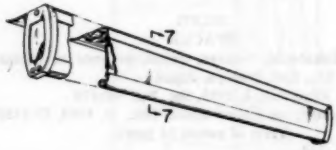


292,872
SPACER
Katsumasa Takahashi, Nagoya, Japan, assignor to Kitagawa Industries Co., Ltd., Nagoya, Japan
Filed Jun. 3, 1985, Ser. No. 740,418
Claims priority, application Japan, Dec. 14, 1984, 59-51597
Term of patent 14 years
U.S. Cl. D8—354



292,873
CASTOR FOR LUGGAGE OR SIMILAR ARTICLES
Lien-Ti Chen, Chang Hwa, Taiwan, assignor to Nan Zong Leather Products Co., Ltd., Chang Twa, Taiwan
Filed Apr. 25, 1985, Ser. No. 726,990
Term of patent 14 years
U.S. Cl. D8—375

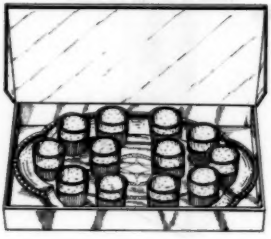
292,874
RAIL ASSEMBLY FOR AWNING OR SIMILAR ARTICLE
Ulrich Clauss, Bisinger Strasse 6, D-7311 Bisingen-Ochsenwang, Fed. Rep. of Germany
Filed Jun. 6, 1984, Ser. No. 617,756
Term of patent 14 years
U.S. Cl. D8—377



292,875
CONTAINER FOR HOLDING A SPRAY CAN
Larry C. Ladson, P.O. Box 145, Russellville, S.C. 29426
Filed Apr. 12, 1984, Ser. No. 599,692
Term of patent 14 years
U.S. Cl. D9—317

292,876
CANDY PACKAGE
Ernest Grunhut, 1682 54th St., Brooklyn, N.Y. 11204
Filed Mar. 18, 1985, Ser. No. 712,532
Term of patent 14 years
U.S. Cl. D9—337

292,877
CANDY PACKAGE
Ernest Grunhut, 1682 54th St., Brooklyn, N.Y. 11204
Filed Mar. 18, 1985, Ser. No. 712,964
Term of patent 14 years
U.S. Cl. D9—337



292,878
DUAL COMPARTMENT SANDWICH PACKAGE
Nicholas D. Commisso, Victor; Edwin R. De Cook, Oaks Corner, both of N.Y.; Ralph E. Hisle, Frankfort, Ill., and Donald Rowe, Newark, N.Y., assignors to McDonald's Corporation, Oak Brook, Ill.
Filed May 20, 1985, Ser. No. 735,700
Term of patent 14 years
U.S. Cl. D9—341

292,879
COMBINED PACKAGING AND CARRYING CONTAINER FOR BOTTLES OR THE LIKE
Peter L. Smith, Beaumaris, Australia, assignor to Product Pak (Australia) Pty. Limited, Australia
Filed Nov. 20, 1984, Ser. No. 673,289
Term of patent 14 years
U.S. Cl. D9—345

292,880
BOTTLE
Andre Jacobs, Meise; Richard May, Brussel, and Marcel Vandebroek, Grimbergen, all of Belgium, assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed Jul. 1, 1985, Ser. No. 750,821
Claims priority, application Benelux, Jan. 4, 1985, 3490-05; Jan. 4, 1985, 3490-10
Term of patent 14 years
U.S. Cl. D9—349

292,881
CONTAINER FOR STORING MEAT PRODUCTS OR THE LIKE
Charles H. Thompson, Woodinville, Wash., assignor to Northwest Containers, Inc., Tacoma, Wash.
Filed Jan. 7, 1985, Ser. No. 689,808
Term of patent 14 years
U.S. Cl. D9—349

292,882
DISPENSING CONTAINER CLOSURE
Richard A. Gross, Crystal Lake, Ill., assignor to Pittway Corporation, Crystal Lake, Ill.
Filed Mar. 18, 1985, Ser. No. 713,176
Term of patent 14 years
U.S. Cl. D9—435

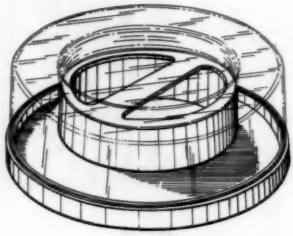
292,883
CONTAINER FOR FOOD PRODUCTS
Christopher J. Griffin, London; John A. Perigo, Hailey Nr Witney, and Geoffrey Tucker, Swindon, all of England, assignors to Metal Box Public Limited Co., Berkshire, England
Filed Jan. 7, 1985, Ser. No. 689,382
Claims priority, application United Kingdom, Jul. 7, 1984, 1 020 815
Term of patent 14 years
U.S. Cl. D9—349

292,884
BOTTLE OR THE LIKE
Robert Pataki, Camberwell, Australia, assignor to The Kiwi Polish Company Pty. Ltd., Australia
Filed Nov. 15, 1984, Ser. No. 672,213
Claims priority, application Australia, May 15, 1984, 7497/84
Term of patent 14 years
U.S. Cl. D9—373

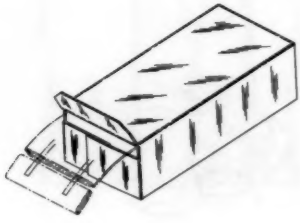
292,885
BOTTLE
Philip C. Best; Edwin F. Neu, both of Cincinnati, Ohio, and John Pardo, Yonkers, N.Y., assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed May 6, 1985, Ser. No. 730,606
Term of patent 14 years
U.S. Cl. D9—376

292,886
DETERGENT CONTAINER
Myron Warwick, 7301 Melanie La., Knoxville, Tenn. 37918
Filed May 13, 1985, Ser. No. 732,920
Term of patent 14 years
U.S. Cl. D9—381

292,887
PACKAGING CONTAINER
Gerard M. Schouten, Lititz, Pa., assignor to Armstrong World Industries, Inc., Lancaster, Pa.
Filed Feb. 27, 1985, Ser. No. 706,137
Term of patent 14 years
U.S. Cl. D9—424



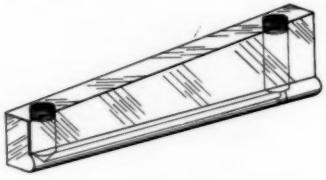
292,888
BAG DISPENSING CARTON
Ronald R. Burns, Naperville, and Robert P. Graves, Jr., Downers Grove, both of Ill., assignors to Viskase Corporation, Chicago, Ill.
Filed Apr. 3, 1985, Ser. No. 719,297
Term of patent 14 years
U.S. Cl. D9—432



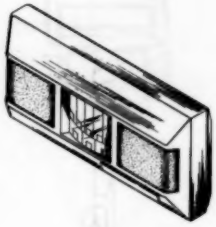
292,889
DISPENSING CLOSURE CAP
Efrem M. Ostrowsky, Highland Park, Ill., assignor to Pittway Corporation, Crystal Lake, Ill.
Filed Mar. 11, 1985, Ser. No. 710,367
Term of patent 14 years
U.S. Cl. D9—449

292,890
WRIST WATCH
Eddy Schoepfer, La Chaux-du-Milieu, Switzerland, assignor to Fabrique Ebel, Societe Anonyme, Switzerland
Filed Apr. 3, 1985, Ser. No. 719,229
Claims priority, application Switzerland, Oct. 4, 1984, DM/004260
Term of patent 14 years
U.S. Cl. D10—39

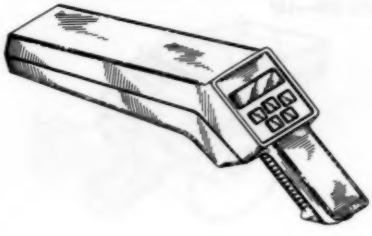
292,891
MANOMETER
Donald Frick, Trevose, and George R. Jackson, Doylestown, both of Pa., assignors to World-Wide Plastics, Inc., Trevose, Pa.
Filed Mar. 26, 1985, Ser. No. 716,364
Term of patent 14 years
U.S. Cl. D10—101



292,892
INTRUSION DETECTOR
Benjamin T. Ronn, Roxbury; Ronald G. Avery, Bethel, and Richard M. O'Grady, Meriden, all of Conn., assignors to Cerberus AG, Mannedorf, Switzerland
Filed Jan. 15, 1985, Ser. No. 691,652
Term of patent 14 years
U.S. Cl. D10—106



292,893
TIMING LIGHT
Mark S. Bakula, Muskego; Donald W. Doman, Janesville; David R. Ellingen, Kenosha; Gene P. Hopp, Racine; Keith R. Malek, Kenosha; Steven E. Michalski, Milwaukee; Larry D. Pacetti, Kenosha; William T. Pagac, Kenosha; Steven R. Wente, Kenosha, and Raymond R. Zuzinec, Sr., Kenosha, all of Wis., assignors to Snap-on Tools Corporation, Kenosha, Wis.
Filed Feb. 18, 1986, Ser. No. 834,055
Term of patent 14 years
U.S. Cl. D10—112



292,894

FLEXIBLE TRAFFIC DELINEATOR POST

John H. Whitmer, Elkhart, and Randy J. Brown, Granger, both of Ind., assignors to Industrial Plastics Corporation, Elkhart, Ind.

Filed May 13, 1986, Ser. No. 862,834

Term of patent 14 years

U.S. Cl. D10—113

292,895

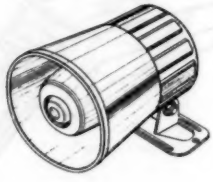
SIREN

Takatoshi Hayashi, Kohnosu, Japan, assignor to Kobishi Electric Co., Ltd., Tokyo, Japan

Filed Feb. 21, 1985, Ser. No. 703,875

Term of patent 14 years

U.S. Cl. D10—120



292,896

NECKLACE

Alexis V. Kirk, New York, N.Y., assignor to Somersett Moon Ltd., New York, N.Y.

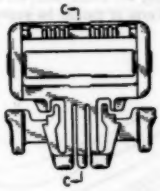
Filed Feb. 22, 1985, Ser. No. 704,478

Term of patent 14 years

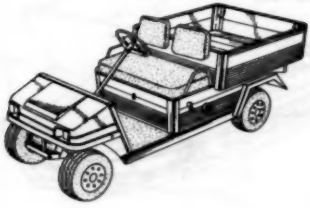
U.S. Cl. D11—11

292,897
FLAGPOLE HOLDER
Julian Restrepo, Calle 44 - 42-55, Medellin, Colombia
Filed Apr. 2, 1985, Ser. No. 719,104
Term of patent 14 years
U.S. Cl. D11—182

292,898
BUCKLE
Kazumi Kasai, Namerikawa, Japan, assignor to Nippon Notion Kogyo Co. Ltd., Tokyo, Japan
Filed Mar. 18, 1985, Ser. No. 712,443
Claims priority, application Japan, Nov. 28, 1984, D59-48927
Term of patent 14 years
U.S. Cl. D11—216



292,899
UTILITY VEHICLE
Donald G. Samuelson, Augusta, Ga.; Dominic Saporito, Fanwood, N.J., and Justin Brehm, Augusta, Ga., assignors to Club Car, Inc., Augusta, Ga.
Filed Dec. 11, 1985, Ser. No. 807,522
Term of patent 14 years
U.S. Cl. D12—16



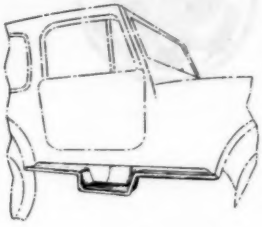
292,900
PAIR OF FRONT PANNIER SUPPORT RACKS FOR BICYCLES
James R. Blackburn, Los Gatos, and James Gentes, San Jose, both of Calif., assignors to Jim Blackburn Designs, Inc., Campbell, Calif.
Filed Jan. 5, 1984, Ser. No. 568,333
Term of patent 14 years
U.S. Cl. D12—158

292,901
MODULAR VEHICLE BUMPER
Donald L. Manning, 4002 Normanwood Dr., Orchard Lake, Mich. 48033
Filed Jan. 29, 1985, Ser. No. 695,878
Term of patent 14 years
U.S. Cl. D12—169

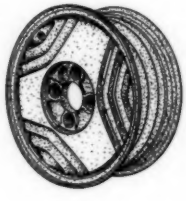
292,902
AUTOMOBILE FRONT BUMPER
Shigeru Miki, Atsugi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan
Filed Sep. 23, 1985, Ser. No. 779,265
Term of patent 14 years
U.S. Cl. D12—169

292,903
FRONT FENDER FOR AN AUTOMOBILE
Tadao Otsuki, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan
Filed Nov. 5, 1985, Ser. No. 803,917
Term of patent 14 years
U.S. Cl. D12—184

292,904
COMBINED RUNNING BOARD AND STEP
Kim J. Bielby, 3464 Blackwood Dr., Traverse City, Mich. 48684
Filed May 20, 1985, Ser. No. 735,538
Term of patent 14 years
U.S. Cl. D12—203



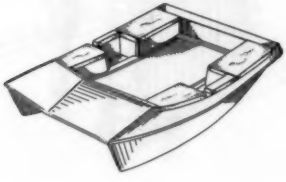
292,905
WHEEL
Björn E. A. Envall, Vänersborg, and Geoffrey P. Wardle, Trollhättan, both of Sweden, assignors to Saab-Scania Aktiebolag, Trollhattan, Sweden
Filed Apr. 16, 1985, Ser. No. 723,934
Term of patent 14 years
U.S. Cl. D12—206



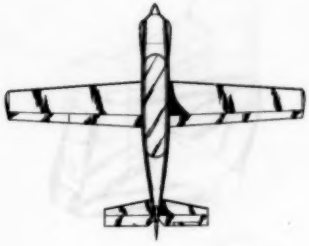
292,906
WHEEL COVER
Robert L. Menking, St. Clair Shores; Michael J. Pitera, Sterling Heights, and Robert B. Spaulding, Utica, all of Mich., assignors to General Motors Corporation, Detroit, Mich.
Filed Mar. 4, 1985, Ser. No. 708,030
Term of patent 14 years
U.S. Cl. D12—211

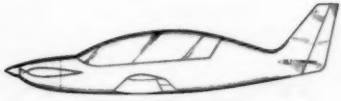
292,907
WHEEL COVER
John A. Cafaro, West Bloomfield; Richard A. Schell, and Robert B. Spaulding, both of Utica, all of Mich., assignors to General Motors Corporation, Detroit, Mich.
Filed Mar. 15, 1985, Ser. No. 712,085
Term of patent 14 years
U.S. Cl. D12—211

292,908
BOAT
John R. Moar, 395 West Ridge Drive, Waterloo, Ontario, Canada (N2L 5Y1)
Filed Oct. 25, 1985, Ser. No. 791,618
Term of patent 14 years
U.S. Cl. D12—300

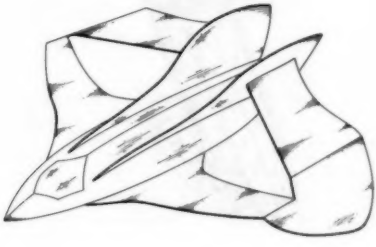


292,909
AIRPLANE
Anthony F. Drake, P.O. Box 31192, Santa Barbara, Calif. 93130-1192
Filed Apr. 26, 1985, Ser. No. 727,578
Term of patent 14 years
U.S. Cl. D12—319

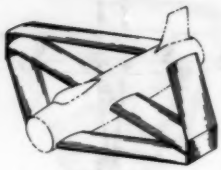




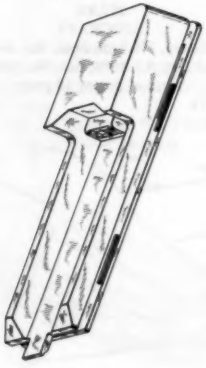
292,910
AIRCRAFT
Robert H. McGiboney, 210 Lilla Jean, San Antonio, Tex. 78223
Filed Aug. 13, 1984, Ser. No. 640,366
Term of patent 14 years
U.S. Cl. D12—331



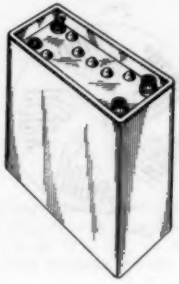
292,911
PAIR OF WINGS FOR AN AIRPLANE
Robert Argondezzi, 706 W. Elm St., Norristown, Pa. 19401
Filed Jul. 24, 1985, Ser. No. 758,261
Term of patent 14 years
U.S. Cl. D12—345



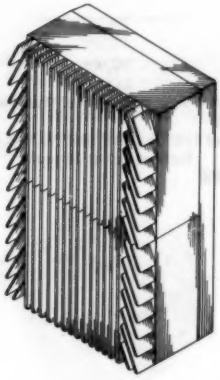
292,912
CHARGER BASE FOR A BATTERY-OPERATED CAN OPENER
Ronald L. Muller, Old Saybrook, and William J. Rakocy, Madison, both of Conn., assignors to North American Philips Corporation, New York, N.Y.
Filed Mar. 7, 1985, Ser. No. 709,163
Term of patent 14 years
U.S. Cl. D13—6



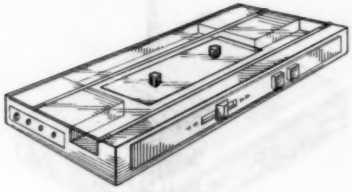
292,913
BATTERY PACK
Richard Shaper, 99 McCoun's La., Old Brookville, N.Y. 11545
Filed Feb. 19, 1985, Ser. No. 702,885
Term of patent 14 years
U.S. Cl. D13—8



292,914
CASING FOR A SPEED CONTROL DEVICE OR THE LIKE
Jorgen J. Moeller, Sonderborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark
Division of Ser. No. 806,538, Dec. 9, 1985, Pat. No. 287,178, which is a division of Ser. No. 741,735, Jun. 5, 1985, Pat. No. Des. 284,076, which is a division of Ser. No. 464,055, Feb. 4, 1983, Pat. No. Des. 281,969. This application Aug. 29, 1986, Ser. No. 902,383
Term of patent 14 years
U.S. Cl. D13—40

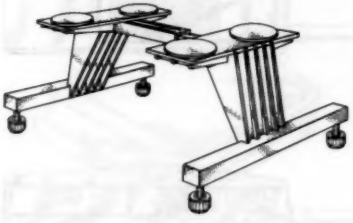


292,915
PLAYER/RECORDER FOR SPEECH CARDS
Judy S. Yeh, 1017 Fair Oaks Ave., #31, South Pasadena, Calif. 91030
Filed Nov. 5, 1984, Ser. No. 668,194
Term of patent 14 years
U.S. Cl. D14—1

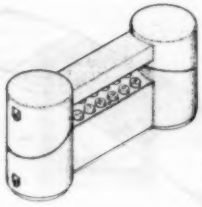


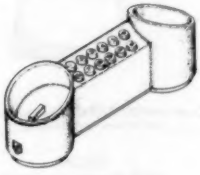
292,916
NON-ELECTRONIC SOUND AMPLIFIER
Tameaki Ikeda, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Feb. 12, 1985, Ser. No. 700,914
Claims priority, application Japan, Aug. 24, 1984, 59-35385
The portion of the term of this patent subsequent to Nov. 25, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—36

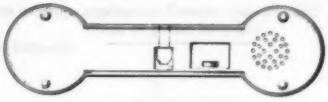
292,917
ADJUSTABLE SPEAKER STAND
Norman L. Thomasen, 81 Shoal Dr., Daly City, Calif. 94014
Filed May 31, 1985, Ser. No. 739,830
Term of patent 14 years
U.S. Cl. D14—38



292,918
TELEPHONE
Rick Graham, North Hollywood, Calif., assignor to TeleQuest, Inc., San Diego, Calif.
Filed Jul. 22, 1986, Ser. No. 889,101
Term of patent 14 years
U.S. Cl. D14—53

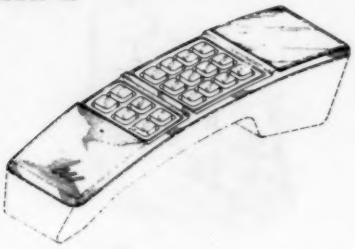




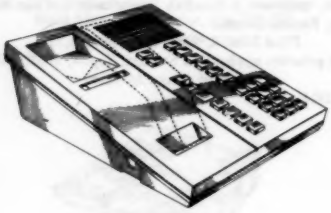


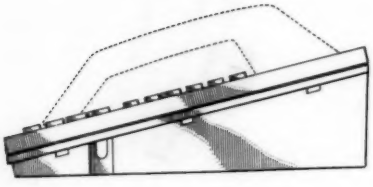
292,919
TELEPHONE SET
Erika Lagerbielke, and Tomas Ahlman, both of Hägersten, Sweden, assignors to Swedish Telecommunications Administration, Farsta, Sweden
Filed Mar. 4, 1986, Ser. No. 841,718
Claims priority, application Sweden, Sep. 4, 1985, M85-2063
Term of patent 14 years
U.S. Cl. D14—53

292,920
DIALING BACK PLATE FOR A HANDSET TELEPHONE
Terrance N. Taylor, Cary, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Filed Feb. 25, 1986, Ser. No. 836,200
The portion of the term of this patent subsequent to Nov. 3, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—62



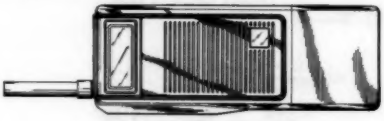
292,921
TELEPHONE STAND WITH DIALING MEANS
Karen L. Korellis, Andover, Mass., assignor to Wang Laboratories, Inc., Lowell, Mass.
Filed Mar. 24, 1986, Ser. No. 845,747
Term of patent 14 years
U.S. Cl. D14—62



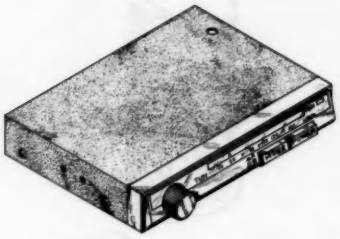


292,922
PORTABLE TELEPHONE SET
Douglas H. Grambush, Irvine, and Alix A. Moore, Santa Ana, both of Calif., assignors to Fujitsu Limited, Kawasaki, Japan
Filed Jan. 27, 1986, Ser. No. 822,855
Term of patent 14 years
U.S. Cl. D14—64

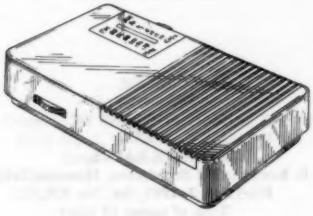
292,923
PORTABLE TWO-WAY RADIO
Henry A. Schaefer, and Richard Culbertson, both of Lynchburg, Va., assignors to General Electric Company, Schenectady, N.Y.
Filed Oct. 24, 1985, Ser. No. 790,902
Term of patent 14 years
U.S. Cl. D14—68



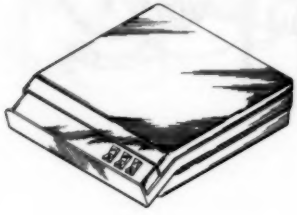
292,924
AM STEREOPHONIC SIGNAL CONVERTER
Takatsugu Yosida, Funabashi, Japan, assignor to Arrow Commerce Company, Ltd., Japan
Filed Dec. 16, 1985, Ser. No. 809,301
Claims priority, application Japan, Sep. 6, 1985, 60-37449
Term of patent 14 years
U.S. Cl. D14—68



292,925
RADIO
Paul F. Siegel, Ridgefield, and Andrew Mark, Stamford, both of Conn., assignors to Salton, Inc., Deerfield, Ill.
Filed Jul. 12, 1985, Ser. No. 754,089
Term of patent 14 years
U.S. Cl. D14—68

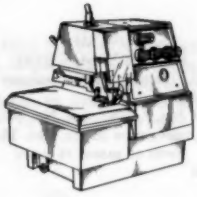


292,926
COMBINED DATA TRANSMITTER/RECEIVER MODEM AND SECURITY MODEM FOR PREVENTION OF UNAUTHORIZED COMPUTER ACCESS
Lionel D. Gillespie, Atlanta; Frank B. Golley, IV, Decatur; Phillip J. Snoke, Atlanta, and Kenneth D. Timmerman, Smyrna, all of Ga., assignors to Lockheed Corporation, Calabasas, Calif.
Filed Feb. 19, 1985, Ser. No. 702,476
Term of patent 14 years
U.S. Cl. D14—107

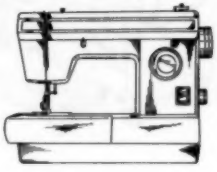


292,927
MOUSE FOR CONTROLLING THE CURSOR ON COMPUTER DISPLAY SCREEN
Philip J. Burnstein, Skokie, and Syng N. Kim, Hoffman Estates, both of Ill., assignors to Wico Distribution Company, L.P., Niles, Ill.
Filed Nov. 16, 1984, Ser. No. 672,089
Term of patent 14 years
U.S. Cl. D14—114

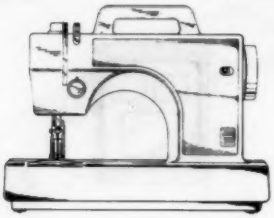
292,928
SEWING MACHINE
Jong-Hsien Lo, Taipei Hsien, Taiwan, assignor to Kaulin Manufacturing Co., Ltd., Taipei, Taiwan
Filed Sep. 18, 1985, Ser. No. 777,090
Claims priority, application Taiwan, Aug. 22, 1985, 74304222
Term of patent 14 years
U.S. Cl. D15—69



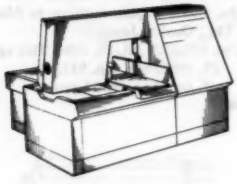
292,929
SEWING MACHINE
Yoshihide Yoneda, Oaka, Japan, assignor to Maruzen Sewing Machine Co., Ltd., Osaka, Japan
Division of Ser. No. 629,553, Jul. 10, 1984. This application Sep. 25, 1986, Ser. No. 911,436
Term of patent 14 years
U.S. Cl. D15—69



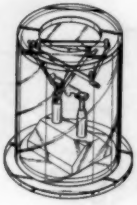
292,930
SEWING MACHINE
Yoshihide Yoneda, Osaka, Japan, assignor to Maruzen Sewing Machine Co., Ltd., Osaka, Japan
Filed Jan. 23, 1985, Ser. No. 694,230
Term of patent 14 years
U.S. Cl. D15—70



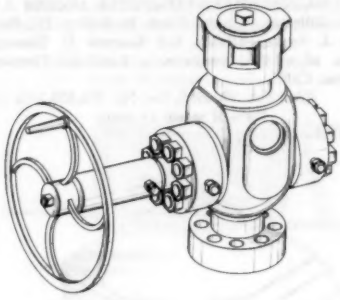
292,931
BANDSAW MACHINE
Masayuki Taguchi, Hatano, Japan, assignor to Amada Company, Limited, Japan
Filed Jun. 7, 1985, Ser. No. 742,515
Claims priority, application Japan, Dec. 13, 1984, 59-050921
Term of patent 14 years
U.S. Cl. D15—134



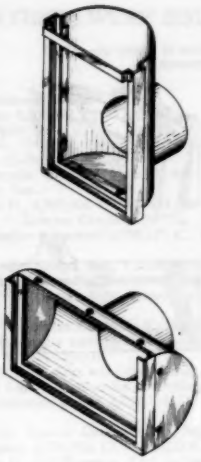
292,932
DEMONSTRATION DEVICE
Joseph A. McGinley, Colchester, Conn., assignor to Codman & Shurtleff Inc., Randolph, Mass.
Filed Nov. 13, 1984, Ser. No. 670,512
Term of patent 14 years
U.S. Cl. D19—62



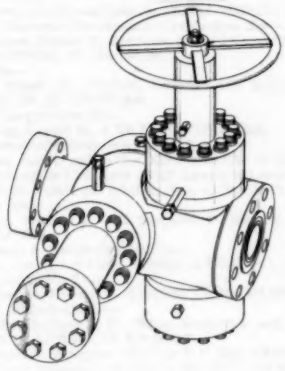
292,933
GATE VALVE
Willard E. Kemp, 14702 Broadgreen, Houston, Tex. 77079
Filed Sep. 2, 1983, Ser. No. 529,152
Term of patent 14 years
U.S. Cl. D23—244



292,934
IRRIGATION WATER DRAINAGE UNIT
Daryl D. Alberico, Rte. 2, Box 219-A, Willows, Calif. 95988
Filed Mar. 21, 1985, Ser. No. 714,409
Term of patent 14 years
U.S. Cl. D23—259

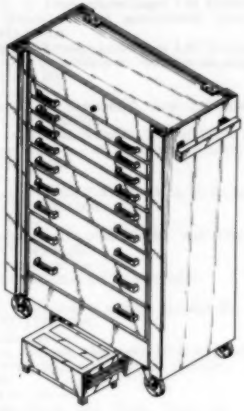


292,935
GATE VALVE
Willard E. Kemp, 14702 Broadgreen, Houston, Tex. 77079
Filed Sep. 2, 1983, Ser. No. 528,749
Term of patent 14 years
U.S. Cl. D23—244



292,936
ROOF
Donald L. Richter, Rolling Hills Estates, Calif., assignor to Temcor, Torrance, Calif.
Filed Dec. 12, 1984, Ser. No. 680,824
Term of patent 14 years
U.S. Cl. D25—56

292,937
TOOL CHEST WITH RETRACTABLE STEP
Clyde D. Richey, Jamestown, N.Y., assignor to The Jacobs Manufacturing Company, Bloomfield, Conn.
Filed Feb. 15, 1984, Ser. No. 580,257
Term of patent 14 years
U.S. Cl. D34—19



292,938

SPIRAL CONVEYOR

Curtis S. Tarlton, Florham Park, and Richard A. Ford, Blackwood, both of N.J., assignors to C. & T. Tarlton, Inc., Union, N.J.

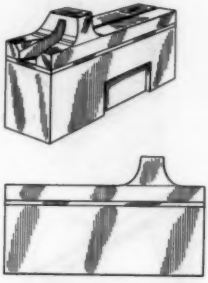
Filed Apr. 22, 1985, Ser. No. 725,371
Term of patent 14 years
U.S. Cl. D34—29

292,939

FARE COLLECTION TICKET TRANSPORT

Kenneth R. Aubrey, San Diego, Calif., assignor to Cubic Western Data, San Diego, Calif.

Filed Apr. 18, 1985, Ser. No. 724,658
Term of patent 14 years
U.S. Cl. D99—99



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 24TH DAY OF NOVEMBER, 1987

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Ahlstrom Corporation: *See*—
Engstrom, Folke, 4,708,092, Cl. 122-4.00D.

A. B. Chance Company: *See*—
Hoyt, Robert M.; Dziedzic, Edward; and Rinehart, William M., 4,707,964, Cl. 52-742.000.

A-Yan, Kuo. Down quilt. 4,707,873, Cl. 5-502.000.

Abbott Laboratories: *See*—
Kidera, Edward H., 4,708,604, Cl. 417-477.000.

Abdelghani, Ali A., to Birtcher Corporation, The. Ultrasonic generating system with feedback control. 4,708,127, Cl. 128-24.00A.

Abe, Shinya: *See*—
Yamatsu, Isao; Abe, Shinya; Inai, Yuichi; Suzuki, Takeshi; Kinoshita, Kensaku; Mishima, Mannen; Katoh, Yoshinori; Kobayashi, Seiichi; Murakami, Manabu; and Yamada, Kouzi, 4,709,079, Cl. 560-66.000.

Abe, Shizuo, to Toyota Jidosha Kabushiki Kaisha. Driving force transmission mechanism using a timing belt for an internal combustion engine. 4,708,700, Cl. 474-205.000.

Abe, Yoshiharu; Wazaki, Yoshio; and Oono, Tetsuya, to Honda Giken Kogyo Kabushiki Kaisha. Method for controlling the supply of fuel for an internal combustion engine. 4,709,334, Cl. 364-431.050.

Abe, Yoshio: *See*—
Iimura, Seiji; Abe, Yoshio; Okumura, Jun; Naito, Takayuki; and Kamachi, Hajime, 4,708,955, Cl. 514-202.000.

Abildgaard, William H.; and Hymmen, Karl, to VeloBind, Inc. Bookbinding method using strips. 4,708,560, Cl. 412-7.000.

Abou-Gharbia, Magid A.; and Schiehser, Guy A., to American Home Products Corporation. Bicyclic spirosulfonimides with psychotropic activity. 4,709,027, Cl. 544-6.000.

AbuJudom, David N., II; Dougherty, Joseph P.; and Stengel, Kevin M. Piezoelectric fluid pumping apparatus. 4,708,600, Cl. 417-322.000.

Acrowood Corporation: *See*—
Plough, Irving L., 4,708,181, Cl. 144-249.00R.

Adair, Harold L., to W-N Apache Corporation. Method of positioning a transfer arm. 4,708,581, Cl. 414-786.000.

Adam, Bernd, to Siemens Aktiengesellschaft. Contact arrangement with spacers separating contact levers from each other. 4,709,127, Cl. 200-146.00R.

Adams, John M., to Atlas Casing Company, Inc. Knife assembly for cutting sausage casings. 4,708,044, Cl. 83-545.000.

Adams, Steven P.; Towler, Dwight A.; and Glaser, Luis, to Washington University. Novel inhibitor peptides. 4,709,012, Cl. 530-328.000.

ADT, Inc.: *See*—
Guscott, John K.; and Vulgaris, George, 4,709,151, Cl. 250-342.000.

Advanced Resource Development Corporation: *See*—
Silverman, Eugene B.; Simmons, Richard K.; and Croston, Robert B., 4,709,265, Cl. 358-108.000.

AE Plc: *See*—
Day, Roger A.; Tommis, Norman; and Baker, Andrew R., 4,708,104, Cl. 123-193.00P.

Aeroquip Corporation: *See*—
Hunting, Ronald M., 4,708,377, Cl. 285-407.000.

AG fur industrielle Elektronik AGIE: *See*—
Lodetti, Attilio; and Tobler, Karl, 4,709,130, Cl. 219-69.00W.

AG fur industrielle Elektronik AGIE Losone b. Locarno: *See*—
Del Bello, Athos; and Kilcher, Beat, 4,709,131, Cl. 219-69.00M.

AGA AB: *See*—
Ziegler, Michael J.; and Simpkins, F. Richard, 4,708,730, Cl. 65-261.000.

Agfa-Gevaert Aktiengesellschaft: *See*—
Fryda, Georg; and Hehn, Wilfried, 4,708,453, Cl. 354-320.000.

Agfa-Gevaert N.V.: *See*—
Verbruggen, Herman F., 4,708,450, Cl. 354-303.000.

Aggarwal, Mahesh C.: *See*—
Mielnik, Thaddeus J., Jr.; Fisher, Kenneth J.; and Aggarwal, Mahesh C., 4,708,849, Cl. 422-26.000.

Agnew, Boyd F., to Agnew, Gertrude B. F. High efficiency particulate air filter and separators, therefor. 4,708,724, Cl. 55-500.000.

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Agnew, Boyd F., 4,708,724, Cl. 55-500.000.

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Smith, Gerald D.; and Werner, Ben E., 4,707,918, Cl. 30-228.000.

AHED Research and Development Inc.: *See*—
Hennessy, Arnold, 4,707,868, Cl. 4-362.000.

Aikawa, Hiroshi: *See*—
Tabata, Toshiyuki; Aikawa, Hiroshi; Fujiwara, Yoshinari; and Yoda, Norio, 4,708,329, Cl. 267-140.100.

Aikawa, Shinichi: *See*—
Enami, Katsuya; Kawamura, Sinobu; Nagase, Fumio; and Aikawa, Shinichi, 4,709,285, Cl. 360-104.000.

Air Products and Chemicals, Inc.: *See*—
Johnson, Thomas A.; and Cooper, Cawas A., 4,709,028, Cl. 544-106.000.
Marsella, John A., 4,709,034, Cl. 544-401.000.
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Weimer, Robert F., 4,708,860, Cl. 423-579.000.

Airapetian, Robert R.: *See*—
Mkhikian, Robert M.; Shaginian, Suren G.; Markarian, Temur G.; Khaidukov, Georgy K.; Velidzhanian, Sofia V.; Manukian, Artashes R.; Karapetian, Artur K.; Kazarian, Aram V.; and Airapetian, Robert R., 4,708,628, Cl. 425-406.000.

Airsonics License Partnership: *See*—
Gallant, Ben J., 4,708,534, Cl. 406-75.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Momose, Yutaka; and Yamaguro, Akira, 4,708,639, Cl. 431-215.000.
Nakamura, Kaoru; Sakata, Shinji; Ochisi, Chiaki; Furuta, Yoichi; and Tsubouchi, Kaoru, 4,707,989, Cl. 60-589.000.
Okumura, Nobuo, 4,708,725, Cl. 62-6.000.

Aisin-Warner Kabushiki Kaisha: *See*—
Harada, Yoshiharu; Taga, Yutaka; Fukumura, Kagenori; Hayakawa, Yoichi; and Kawai, Masao, 4,708,032, Cl. 74-866.000.

Ajinomoto Co., Inc.: *See*—
Ishikuma, Mineyasu; Hasui, Hiroshi; and Ono, Toshiyuki, 4,708,881, Cl. 426-524.000.

Akahori, Ichiro: *See*—
Shiozaki, Makoto; and Akahori, Ichiro, 4,708,111, Cl. 123-357.000.

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Akao, Mutsuo, to Fuji Photo Film Co., Ltd. Easily openable packaging material for photographic photosensitive materials. 4,708,896, Cl. 428-35.000.

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Suda, Yasuo; Akashi, Akira; and Hiramatsu, Akira, 4,709,138, Cl. 250-201.000.

Akatsu, Toshio: *See*—
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Akeel, Hadi A.: *See*—
Janashak, Robert J.; Felice, Christopher G.; and Akeel, Hadi A., 4,708,175, Cl. 141-1.000.

Akegi, Seiji, to UBE Industries, Ltd. Method for measuring volume and apparatus therefor. 4,708,016, Cl. 73-149.000.

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Akerberg, Dag E., to Telefonaktiebolaget LM Ericsson. Method of synchronizing radio transmitters for synchronous radio transmission. 4,709,402, Cl. 455-51.000.

Akesson, Bengt A.: *See*—
Bergman, Sten G. A.; Sagefors, K. Ivar; and Akesson, Bengt A., 4,708,522, Cl. 405-55.000.

Akimoto, Taizo; and Kawai, Masahiko, to Fuji Photo Film Co., Ltd.; and Ikegami Tsushinki Co., Ltd. Automatic frequency pulling circuit. 4,709,268, Cl. 358-150.000.

Akira, Noda: *See*—
Kenji, Yabusaki; Hitoshi, Tozawa; Akira, Noda; and Takashi, Ito, 4,708,477, Cl. 356-222.000.

Akiyoshi, Eiichi: *See*—
Kanto, Masaharu; Akiyoshi, Eiichi; and Ohtake, Yasuhisa, 4,708,680, Cl. 445-47.000.

Aktiebolaget Carl Munters: *See*—
Norback, Per G., 4,708,832, Cl. 261-153.000.

Akva A/S: *See*—
Molaug, Ole; Havrevold, Sveinung B.; and Skj veland, Odd, 4,708,090, Cl. 119-51.00R.

Akzona Incorporated: *See*—
Diamantoglou, Michael; Magerlein, Helmut; Brodowski, Walter; Grimm, Wolfgang; and Meyer, Gerhard, 4,708,985, Cl. 525-166.000.

Albert Rolland, S.A.: *See*—
Labaune, Jean-Pierre; and Esain, Pierre B., 4,709,051, Cl. 548-533.000.

Alburger, James R. Faceted gem cut from shallow gemstone material. 4,708,001, Cl. 63-32.000.

Alexandrovich, Peter S.: *See*—
Myers, Drewfus Y., Jr.; Alexandrovich, Peter S.; Pearce, Glenn T.; Santilli, Domenic; Sreekumar, Chandrasekha; Berwick, Martin

A.; Upson, Donald A.; and Goebel, William K., 4,708,923, Cl. 430-112.000.
Alfred Teves GmbH: *See*—
Belart, Juan; Seibert, Wolfram; and Ocvirk, Norbert, 4,708,405, Cl. 303-114.000.
Klein, Hans-Christof, 4,708,401, Cl. 303-6.00R.
Seibert, Wolfram; Ocvirk, Norbert; and Schonlau, Juergen, 4,708,404, Cl. 303-114.000.
Alkaitis, Saulius A.: *See*—
Fitzgerald, Maurice E.; Braunstein, David M.; Alkaitis, Saulius A.; and Pinsky, Naum, 4,708,918, Cl. 429-210.000.
Allard, Vincent L.; and Gallard, Henry, to BICC Public Limited Company. Winding apparatus. 4,708,298, Cl. 242-25.00A.
Allen, Larry M., to Chemex Pharmaceuticals. Lipoxygenase inhibitors. 4,708,964, Cl. 514-533.000.
Allen, Mark L. Bicycle lock. 4,708,004, Cl. 70-226.000.
Allert, Kurt. Clamping shell. 4,708,512, Cl. 403-344.000.
Alley, Lewis F.: *See*—
Powers, Richard G.; Zeets, Joseph S.; Currier, Joseph G.; and Alley, Lewis F., 4,708,296, Cl. 241-82.200.
Allied Corporation: *See*—
Appling, James; and Gongwer, Calvin A., 4,709,358, Cl. 367-106.000.
Dahlstrom, David K.; Fife, Merrill E.; and Judy, Charles R., 4,709,361, Cl. 367-165.000.
Green, Norman, 4,709,238, Cl. 342-427.000.
Masilamani, Divakaran; Hammond, George S.; and Murthy, Andiappan K. S., 4,709,101, Cl. 568-697.000.
Mohn, Walter R., 4,708,194, Cl. 164-463.000.
Samuels, George J., 4,709,122, Cl. 174-52.0FP.
Allington, Robert W., to Isco, Inc. Method for operating an absorbance monitor. 4,709,190, Cl. 315-307.000.
Alloy Surfaces Company, Inc.: *See*—
Baldi, Alfonso L., 4,708,913, Cl. 428-607.000.
Allsop, Inc.: *See*—
Clausen, Eivind; and Allsop, Michael G., 4,708,311, Cl. 248-222.200.
Allsop, Michael G.: *See*—
Clausen, Eivind; and Allsop, Michael G., 4,708,311, Cl. 248-222.200.
Almering, Petrus C. M.; and Zwaga, Bocke, to U.S. Philips Corporation. Arrangement for restoring the L.F. content of a digital signal. 4,709,158, Cl. 307-200.00A.
Alpha Grillo-Lotsysteme GmbH: *See*—
Froebel, Gerd; and Stang, Hans W., 4,708,751, Cl. 148-23.000.
Alpha Maschinenbau AG.: *See*—
Post, Friedhelm, 4,708,009, Cl. 72-442.000.
Alps Electric Co., Ltd.: *See*—
Kamijo, Yoshimi, 4,708,914, Cl. 428-690.000.
Kato, Masakazu; and Takoshima, Takehiro, 4,709,243, Cl. 346-76.0PH.
Kikuchi, Jiro, 4,709,403, Cl. 455-126.000.
Mizuta, Ken, 4,709,196, Cl. 318-282.000.
Yamashita, Tatsumaro, 4,709,287, Cl. 360-109.000.
Alsbrook, Daniel E.: *See*—
Mesenich, Gerhard; Bart, Hansueli; and Alsbrook, Daniel E., 4,708,117, Cl. 123-533.000.
AM International Incorporated: *See*—
Schlough, James R., 4,708,277, Cl. 227-88.000.
Amann, Klaus: *See*—
Gaigl, Dietmar; and Amann, Klaus, 4,709,134, Cl. 219-201.000.
Amaya, German, to Brunswick Corporation. Rapid sintering feedstock for injection molding of stainless steel parts. 4,708,741, Cl. 75-251.000.
Amelot, Bernard: *See*—
Savall, Jose; Parmentier, Claude; and Amelot, Bernard, 4,707,890, Cl. 24-122.600.
Amemiya, Tamio: *See*—
Hirose, Isao; Amemiya, Tamio; and Sakai, Tokuji, 4,709,088, Cl. 562-414.000.
American Cyanamid Company: *See*—
Black, Seymour, deceased, 4,708,241, Cl. 206-63.300.
Forgione, Peter S.; and Singh, Balwant, 4,708,984, Cl. 525-127.000.
Los, Marinus; Long, Don W.; and Withers, Gregory P., 4,709,036, Cl. 546-167.000.
American Gas Association: *See*—
Vishwanath, Palamadi S., 4,708,635, Cl. 431-1.000.
American Home Products Corporation: *See*—
Abou-Gharbia, Magid A.; and Schiehser, Guy A., 4,709,027, Cl. 544-6.000.
Mewshaw, Richard E.; and Commons, Thomas J., 4,709,025, Cl. 540-355.000.
Mobilio, Dominick; Demerson, Christopher A.; and Humber, Leslie G., 4,709,048, Cl. 548-439.000.
American Sterilizer Company: *See*—
Mielnik, Thaddeus J., Jr.; Fisher, Kenneth J.; and Aggarwal, Mahesh C., 4,708,849, Cl. 422-26.000.
American Telephone and Telegraph Company: *See*—
Farrow, Cecil W., 4,709,374, Cl. 375-13.000.
American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
Atal, Bishnu S.; and Caspers, Barbara E., 4,709,390, Cl. 381-51.000.
Chandross, Edwin A.; Dean, Robert E.; Gallagher, Patrick K.; Levy, Roland A.; Schrey, Frank; and Smolinsky, Gerald, 4,708,884, Cl. 427-39.000.
Forrest, Stephen R.; Lieberman, Robert A.; and Panock, Richard L., 4,709,413, Cl. 455-606.000.
Amirikian, Arsham, to Amirikian, Arsham. Stabilizer for floating and submersible structures. 4,708,081, Cl. 114-230.000.
Amith, Avraham: *See*—
Blank, Richard E.; Tien, Albert F.; and Amith, Avraham, 4,708,677, Cl. 445-3.000.
Ammermann, Eberhard: *See*—
Rentzea, Costin; Buschmann, Ernst; Himmele, Walter; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,708,960, Cl. 514-383.000.
Schirmer, Ulrich; Karbach, Stefan; Pommer, Ernst-Heinrich; Ammermann, Eberhard; Steglich, Wolfgang; Schwalge, Barbara A. M.; and Anke, Timm, 4,709,078, Cl. 560-060.000.
Amoco Corporation: *See*—
Beynet, Pierre A.; and von Aschwege, J. Thomas, 4,708,525, Cl. 405-195.000.
Peters, Albert W.; and MacCallum, Gregory J., 4,708,787, Cl. 208-130.000.
AMP Incorporated: *See*—
Fisher, Robert L., Jr., 4,708,666, Cl. 439-580.000.
Himes, John L., Jr.; McCleerey, Earl W.; and Reynolds, Charles E., 4,708,412, Cl. 439-95.000.
Klein, David A., 4,708,662, Cl. 439-353.000.
Walters, Cecil K., 4,709,253, Cl. 357-68.000.
Amphenol Corporation: *See*—
Bellet, Richard J.; Broyer, Ephraim; Bekker, Alex Y.; and Lace, Melvin A., 4,708,839, Cl. 264-85.000.
White, Rowland S., 4,708,415, Cl. 439-633.000.
Amsted Industries Incorporated: *See*—
Sharp, Steve M.; Holstrom, John R.; Gain, Lorand H., Jr.; and Ballun, John V., 4,708,160, Cl. 137-368.000.
Amtel, Inc.: *See*—
Pollack, Jack; and Pabers, Richard F., 4,708,178, Cl. 141-279.000.
Anachemia Solvents Limited: *See*—
McGregor, Ian R.; Jackson, D. Keith; Brown, Walter F. M.; and Burrell, Kenneth, 4,708,775, Cl. 203-40.000.
Analog Devices, Inc.: *See*—
Brokaw, Adrian P., 4,709,167, Cl. 307-443.000.
Ancillotti, Enrico. Stationary bicycle with inclinable pedal crank axes for treating knee anomalies. 4,708,128, Cl. 128-25.00R.
Ancra Corporation: *See*—
Jensen, Richard H., 4,708,549, Cl. 410-105.000.
Anderson, Andrew G.; and Shoji, Leigh A., to Canadian Fram Limited. Double acting clutch. 4,708,229, Cl. 192-87.170.
Anderson, Charles W.: *See*—
Edwards, Gene R.; and Anderson, Charles W., 4,709,206, Cl. 324-158.00P.
Anderson, Paul A.: *See*—
Weiler, Gerhard H.; Anderson, Paul A.; and Fox, Kenneth A., 4,707,966, Cl. 53-410.000.
Anderson, Robert D.; Estes, John D.; Carta, John; and Page, Gilbert J., to Brunswick Corporation. Expandable shelter system providing collective protection. 4,707,953, Cl. 52-63.000.
Ando, Takao: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,708,950, Cl. 514-42.000.
Andresen, Brian D.; and Saxena, Vinit, to Sepragen Corporation. Chromatography column-electrophoresis system. 4,708,782, Cl. 204-299.00R.
Andrews, Arthur S.; and Widmer, David S., to U.S. Philips Corporation. Tube cell for atomic absorption spectrophotometry. 4,708,478, Cl. 356-244.000.
Andriessen, Wilhelmus: *See*—
Schaeffer, Norbert; Bettinger, Gunter; Goetz, Klaus; Pfefferkorn, Dietmar; Burkle, Ottmar; Schmidts, Kurt; Schneider, Pierre; Wagner, Werner; Wietholter, Dieter; Dietze, Herbert; and Andriessen, Wilhelmus, 4,709,288, Cl. 360-130.210.
Andriewsky, Miguel S. Extensile beams for flat-shaped weighing-machines. 4,708,217, Cl. 177-211.000.
Andromaque, S.A.: *See*—
Poorten, Henri V., 4,708,781, Cl. 204-180.900.
Angerbauer, Rolf, to Bayer Aktiengesellschaft. Process for the preparation of 7-amino-3-(3-formamidopyridinium)methyl-3-cephem-4-carboxylate, and its use for the synthesis of β-lactam antibiotics. 4,709,023, Cl. 540-224.000.
Anisa Medical, Inc.: *See*—
Lentz, M. Rigdon, 4,708,713, Cl. 604-5.000.
Anke, Timm: *See*—
Schirmer, Ulrich; Karbach, Stefan; Pommer, Ernst-Heinrich; Ammermann, Eberhard; Steglich, Wolfgang; Schwalge, Barbara A. M.; and Anke, Timm, 4,709,078, Cl. 560-060.000.
Annen, Klaus: *See*—
Hofmeister, Helmut; Annen, Klaus; Laurent, Henry; and Wiechert, Rudolf, 4,708,823, Cl. 260-397.400.
Anthony, Bruce O., Jr.; Batalden, Glenn D.; Mitchell, Glen R.; Schloss, Phillip C.; and Wells, David K., to International Business Machines Corporation. Composite data-processing system using multiple standalone processing systems. 4,709,328, Cl. 364-200.000.
Anti-P, Inc.: *See*—
Rawlings, Kelly R., 4,708,118, Cl. 123-555.000.
Anton, Christian: *See*—
Arnoux, Daniel; Genter, Claude; and Anton, Christian, 4,708,422, Cl. 350-96.150.
Anton Steinecker Maschinenfabrick GmbH: *See*—
Baur, Rolf; and Gruber, Bernhard, 4,708,797, Cl. 210-330.000.

Anttila, Einar; and Folgero , Kare, to ASEA Aktiebolag. Casting line melt supply device. 4,708,192, Cl. 164-323.000.
Anzai, Katsushi: *See*—
Harada, Osamu; Takeda, Yuji; Suematsu, Toshio; Anzai, Katsushi; and Funato, Kazuhiko, 4,708,113, Cl. 123-425.000.
Aoki, Atsuhito: *See*—
Emura, Masaharu; Uetsuki, Haruo; Aoki, Atsuhito; and Kobayashi, Takehiro, 4,708,303, Cl. 242-218.000.
Aoki, Hideo: *See*—
Iizuka, Kenichi; Kitayama, Tooru; Uzuhashi, Hideo; and Aoki, Hideo, 4,709,317, Cl. 363-37.000.
Aoki, Kazuo; and Moteki, Tsutomu, to Chinso Corporation. Apparatus for producing organic filler-blended resin compositions. 4,708,623, Cl. 425-202.000.
Aoki, Kiyoshi: *See*—
Sera, Michitoshi; Watanabe, Mitukazu; and Aoki, Kiyoshi, 4,708,613, Cl. 425-117.000.
Aoki, Masakazu: *See*—
Nakagome, Yoshinobu; Aoki, Masakazu; Horiguchi, Masashi; Shimohigashi, Katsuhiro; and Ikenaga, Shinichi, 4,709,350, Cl. 365-45.000.
Aoki, Tadasi: *See*—
Arima, Takahisa; Ninomiya, Susumu; Horikawa, Yuji; and Aoki, Tadasi, 4,708,372, Cl. 285-150.000.
Aoshima, Toshihisa: *See*—
Sakaibara, Toru; Tsujioka, Shigeo; Kajiura, Toshinori; Aoshima, Toshihisa; and Tonomura, Motonobu, 4,709,231, Cl. 340-729.000.
Appleton Papers Inc.: *See*—
Vosters, Joseph P., 4,707,968, Cl. 53-430.000.
Appling, James; and Gongwer, Calvin A., to Allied Corporation. Bridle configuration for towed underwater vehicle. 4,709,358, Cl. 367-106.000.
Apsley Metals Limited, a British Company: *See*—
McGlashen, James N., 4,708,840, Cl. 264-501.000.
Arai, Hatsuyuki. Upper plate driving system for surface lapping machine. 4,707,945, Cl. 51-118.000.
Arai, Hitoshi, to Canon Kabushiki Kaisha. Image reading apparatus which calculates an original reading domain. 4,709,147, Cl. 250-234.000.
Arai, Kazutaka: *See*—
Takahashi, Yasuhiro; Arai, Kazutaka; Ohara, Yoshio; Matsumoto, Hiroo; and Tsuchiya, Syuuzi, 4,709,082, Cl. 560-105.000.
Arani, Aspee A.: *See*—
Irani, Andrew A.; Schulte-Ladbeck, Bernd H.; and Arani, Aspee A., 4,707,883, Cl. 16-110.00R.
Arbed S.A.: *See*—
Melan, Corneille; and Liesch, Jean, 4,708,562, Cl. 414-10.000.
Arbeiter, James H.: *See*—
Bessler, Roger F.; Arbeiter, James H.; and Sinniger, Joseph O., 4,709,394, Cl. 382-49.000.
Arber, Amihadar. Advance date warning system. 4,708,490, Cl. 368-28.000.
Archer Daniels Midland Company: *See*—
Donovan, Dennis; McDonnell, Michael L.; Weigel, Gerald C.; and Long, John E., 4,708,877, Cl. 426-69.000.
Ardal OG Sunndal Verk A.S.: *See*—
Berg, Otto, 4,708,749, Cl. 148-11.50A.
Ardito, John D.: *See*—
Freni, Joseph L., Jr.; and Ardito, John D., 4,708,313, Cl. 248-649.000.
Arend, Donald P., to C & F Stamping Co., Inc. Mold closing apparatus. 4,708,625, Cl. 425-589.000.
Arends, Charles B.: *See*—
Hoffman, Dwight K.; and Arends, Charles B., 4,708,996, Cl. 525-530.000.
Argon, Gideon, to Salgad International Ltd. Shell launching assembly. 4,708,051, Cl. 89-40.020.
Argon, Gideon, to Salgad International Ltd. Height adjustment apparatus for the firing barrel of a shell launcher. 4,708,052, Cl. 89-41.010.
Arima, Takahisa; Ninomiya, Susumu; Horikawa, Yuji; and Aoki, Tadasi, to Kabushiki Kaisha Toshiba. Cross piping construction. 4,708,372, Cl. 285-150.000.
Arkema, Jan. Snorkel. 4,708,135, Cl. 128-201.110.
Armbruster, Gunter, to Flachglass Aktiengesellschaft. Fixed-pane motor-vehicle window and method of installing same. 4,707,958, Cl. 52-208.000.
Armco Inc.: *See*—
Neiheisel, Gary L., 4,708,482, Cl. 356-376.000.
Armoza, Ehud: *See*—
Servi, Rami; Eidelberg, Boaz; Granot, Daniel; Armoza, Ehud; and Sher, Ephraim, 4,708,333, Cl. 270-45.000.
Arndt, Friedrich: *See*—
Harre, Michael; Kruger, Hans-Rudolf; Arndt, Friedrich; and Rusch, Reinhart, 4,709,077, Cl. 560-056.000.
Arndt, Peter J.: *See*—
Wenzel, Franz; Arndt, Peter J.; and Siol, Werner, 4,709,000, Cl. 526-320.000.
Arneklev, Duane R.: *See*—
Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,708,735, Cl. 71-118.000.
Arnold, Fred E.: *See*—
Tsai, Tsu-Tzu; and Arnold, Fred E., 4,709,006, Cl. 528-208.000.
Arnoux, Daniel; Genter, Claude; and Anton, Christian, to Societe Chauvin Arnoux. Multi-wavelength light emitting and receiving apparatus for monitoring connections by optical fibers. 4,708,422, Cl. 350-96.150.
Arthur Pfeiffer Vakuumtechnik Wetzlar GmbH: *See*—
Hack, Robert; and Strzala, Helmut, 4,708,190, Cl. 164-76.100.
Artos Engineering Company: *See*—
Moline, Edward F., 4,707,913, Cl. 29-753.000.
Artzi, Gad B. Snow chains for vehicles. 4,708,035, Cl. 81-15.800.
Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Hayashi, Yoshiharu; and Misumi, Teruyuki, 4,708,734, Cl. 71-100.000.
Hidaka, Hiroyoshi; and Sone, Takonori, 4,709,032, Cl. 544-363.000.
Asai, Akio: *See*—
Ogo, Kazutaka; Hayashi, Masahiro; Suzuki, Takatoshi; Hokao, Katsuiku; Asai, Akio; and Tsuruhashi, Takayuki, 4,709,198, Cl. 318-571.000.
Asakura, Osamu, to Canon Kabushiki Kaisha. Pinch roller assembly for sheet feeding. 4,708,504, Cl. 400-637.000.
Asakura, Osamu: *See*—
Uchikata, Yoshio; Nozaki, Mineo; Nagashima, Masasumi; and Asakura, Osamu, 4,709,242, Cl. 346-76.0PH.
Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Shiozumi, Motoji; Takahashi, Kunio; Torao, Akira; Moriya, Susumu; and Momose, Atsushi, to Kawasaki Steel Corporation. Method for detecting fingerprints using a laser and an apparatus therefor. 4,708,882, Cl. 427-1.000.
Asari, Akira; and Inoue, Youichi, to Kabushiki Kaisha Kobe Seiko Sho. High pressure apparatus. 4,708,627, Cl. 425-405.00H.
Ascher, Gerd; and Riedl, Kurt, to Biochemie. Process for the production of penicillins. 4,708,825, Cl. 2600-544.00N.
ASEA Aktiebolag: *See*—
Anttila, Einar; and Folgero , Kare, 4,708,192, Cl. 164-323.000.
Aseltine, Richard J.: *See*—
Maloney, Timothy R.; Patterson, David E.; and Aseltine, Richard J., 4,708,595, Cl. 417-109.000.
Ashiya, Fumihiro: *See*—
Kakii, Toshiaki; Matsuno, Koichiro; Suzuki, Shuzo; Ashiya, Fumihiro; and Ishihara, Koushi, 4,708,433, Cl. 350-96.220.
Ashland Oil, Inc.: *See*—
Goel, Anil B.; and Tufts, Timothy A., 4,708,971, Cl. 521-167.000.
Goel, Anil B., 4,709,040, Cl. 548-237.000.
Myers, George D., deceased, 4,708,785, Cl. 208-113.000.
Ashley Worldwide, Inc.: *See*—
Gerber, Terry L., 4,707,862, Cl. 2-93.000.
Ashton, Gerard J.; Cavaliere, Joseph R.; and Cheng, Ming T., to International Business Machines Corporation. Logic level control for current switch emitter follower logic. 4,709,169, Cl. 307-455.000.
Askew, Herbert F.; and Davies, Paul R., to Castrol Limited. Oxidation resistant composition containing a benzothiazoline compound. 4,708,810, Cl. 252-50.000.
Aspera S.r.l.: *See*—
Peruzzi, Federigo, 4,708,168, Cl. 137-543.190.
Aspinwall, Hugh M. Manually operated impact driver. 4,708,209, Cl. 173-93.000.
Assaf, Gad, to Geophysical Engineering Company. Apparatus and method for controlling temperature and humidity within an enclosure. 4,707,995, Cl. 62-94.000.
Astolfi, Pietro, to Pico-Glass. Element for securing and hanging picture frames. 4,707,937, Cl. 40-152.100.
Astra-Tech Aktiebolag: *See*—
Lundback, Stig, 4,708,381, Cl. 294-64.100.
AT&T Information Systems Inc.: *See*—
Farrow, Cecil W., 4,709,374, Cl. 375-13.000.
AT&T Technologies, Inc.: *See*—
Miller, Thomas J.; and Nicol, David A., 4,708,726, Cl. 65-3.120.
Atal, Bishnu S.; and Caspers, Barbara E., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Speech message code modifying arrangement. 4,709,390, Cl. 381-51.000.
Atec-Weiss KG: *See*—
Weiss, Rudolf, 4,708,692, Cl. 464-69.000.
Atkin, Graham E. Exhaust system for internal combustion engine. 4,707,987, Cl. 60-324.000.
Atlantic Richfield Company: *See*—
Cathriner, Richard L.; and Roose, Thomas R., 4,708,793, Cl. 210-188.000.
Ingram, Alvin R.; and Di Giulio, Adolph V., 4,708,968, Cl. 521-60.000.
Watson, Robert D., 4,708,475, Cl. 356-417.000.
Younes, Usama E., 4,709,002, Cl. 528-53.000.
Atlas Casing Company, Inc.: *See*—
Adams, John M., 4,708,044, Cl. 83-545.000.
Atlas Copco Aktiebolag: *See*—
Rahm, Erik R., 4,708,210, Cl. 173-169.000.
Attaway, Julian J.: *See*—
Nicholas, John D.; Petree, Larry M.; and Attaway, Julian J., 4,708,517, Cl. 404-64.000.
Aubrey, Leonard S.: *See*—
Brockmeyer, Jerry W.; Aubrey, Leonard S.; Dore, James E.; and Soble, Clifford N., 4,708,326, Cl. 266-159.000.
Aubry, Paul E.; and Poklukar, Josef. Reinforced plastic bag. 4,708,705, Cl. 493-211.000.
Ault, Earle A.: *See*—
Field, Thomas T.; Murrin, Thomas A.; and Ault, Earle A., 4,708,750, Cl. 148-11.50N.
Ausnit, Steven, to Minigrip, Inc. Chain bags, method and apparatus. 4,709,398, Cl. 383-63.000.
Austin, Forrest L.; and Lasley, Duncan T., to Cornelius Company, The. Beverage dispensing valve with easy opening. 4,708,155, Cl. 137-1.000.

Autoipari Kutato es Fejleszto Vallalat: *See*—
Egos, Janosdeak; Tibor, Gergely; and Janos, Szabo , 4,708,226, Cl. 188-251.00A.

Automatic Liquid Packaging, Inc.: *See*—
Weiler, Gerhard H.; Anderson, Paul A.; and Fox, Kenneth A., 4,707,966, Cl. 53-410.000.

Automotive Products plc: *See*—
Leigh-Monstevens, Keith V., 4,708,228, Cl. 192-85.0CA.

Awano, Yoshiyuki, to Du Pont de Nemours, E. I., and Company. Electrical connecting terminal for a connector. 4,708,416, Cl. 439-851.000.

Axelgaard, Jens; and Grussing, Theodore, to Axelgaard, Jens. Electrical stimulation electrode. 4,708,149, Cl. 128-798.000.

Axen, Rolf E.; Kaj, Goran L.; and Bjorkman, Rune, to Pharmacia AB. Method and device for biospecific affinity reactions. 4,708,932, Cl. 435-7.000.

AXIA Incorporated: *See*—
Hiltner, Andrew J., 4,708,070, Cl. 112-10.000.

Axler-Blin, Claudine: *See*—
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435–5.000.

Ayers, David B. Manipulative amusement device. 4,708,345, Cl. 273-153.00S.

Ayers, Ray R., to Shell Oil Company. Seismic array positioning. 4,709,356, Cl. 367-19.000.

Azionaria Costruzioni Macchine Automatiche-A.C.M.A. S.p.A.: *See*—
Odorici, Franco, 4,708,568, Cl. 414-330.000.

Azur Fragrances France S.A.: *See*—
Freytag Von Loringhoven, Andreas E. T. W., 4,708,851, Cl. 422-123.000.

Azzi, Victor D., to Kingston-Warren Corporation, The. Storage rack system. 4,708,252, Cl. 211-192.000.

B. D. Wait Co. Limited: *See*—
Shepherd, Charles G.; and Travale, Samuel, 4,708,830, Cl. 261-70.000.

Baba, Yoshihiko, to Uniden Corporation. Band discriminating method in a receiver. 4,709,407, Cl. 455-226.000.

Babbs, Charles F.: *See*—
Tacker, Willis A., Jr.; Bourland, Joe D.; Babbs, Charles F.; and Geddes, Leslie A., 4,708,145, Cl. 128-419.00D.

Babcock-Hitachi Kabushiki Kaisha: *See*—
Yamaguchi, Tetsurou; Yamamoto, Kohji; and Honda, Kiichiro, 4,709,155, Cl. 250-554.000.

Bacskai, Gyorgy: *See*—
Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Nagy, Mihaly; and Bacskai, Gyorgy, 4,708,733, Cl. 71-94.000.

Bailey, James W.: *See*—
Bement, Laurence J.; and Bailey, James W., 4,708,280, Cl. 228-107.000.

Bailey, Wallace O., to Ford Motor Company. Motor vehicle fuel tank with unitary fuel reservoir. 4,708,170, Cl. 137-574.000.

Bair, Keith A.: *See*—
Chen, Fu; and Bair, Keith A., 4,708,815, Cl. 252-181.000.

Baird, James R.; and Kabay, Steve, to JRB Company, Inc. Hydraulically or manually actuated implement coupler for front end loaders. 4,708,579, Cl. 414-723.000.

Baker, Andrew R.: *See*—
Day, Roger A.; Tommis, Norman; and Baker, Andrew R., 4,708,104, Cl. 123-193.00P.

Baker, David C.; Hand, Elli S.; Haugwitz, Rudiger D.; Narayanan, Venkatachala L.; and Rampal, Jang B., to University of Alabama, Board of Trustees of the. Pyrazine diazohydroxide compounds and methods for their production and use. 4,709,033, Cl. 544-336.000.

Baker Oil Tools, Inc.: *See*—
Halbardier, Floyd A., 4,708,208, Cl. 166-387.000.
Salerni, John V.; and Donovan, Joseph F., 4,708,200, Cl. 166-55.100.

Baker Perkins PLC: *See*—
Newbery, Desmond; and Pickford, Terry A., 4,708,054, Cl. 99-450.400.

Bakker, Eppe; and Hoekstra, Albert, to U.S. Philips Corporation. Dry-shaving apparatus with angled blades. 4,707,915, Cl. 30-43.600.

Baldi, Alfonso L., to Alloy Surfaces Company, Inc. Pyrophoric process and product. 4,708,913, Cl. 428-607.000.

Baldoni, J. Gary, II: *See*—
Buljan, Sergei-Tomislav V.; Lingertat, Helmut; Baldoni, J. Gary, II; and Sarin, Vinod K., 4,708,037, Cl. 82-1.00C.

Baldwin, Paul L.: *See*—
Orndorff, Karl B.; and Baldwin, Paul L., 4,708,223, Cl. 187-1.00R.

Baldwin, Robert W., to Xoma Corporation. Radioimmuno detection of human cancers using anti-tumor monoclonal antibody. 4,708,862, Cl. 424-1.100.

Balk, Hermann, to Reifenhauser GmbH & Co. Maschinenfabrik. Apparatus for spinning monofilaments. 4,708,619, Cl. 425-141.000.

Ball Corporation: *See*—
Reitsema, Harold J., 4,709,146, Cl. 250-231.0SE.

Ballard Medical Products: *See*—
Ford, George W., Jr., 4,708,262, Cl. 222-1.000.

Ballun, John V.: *See*—
Sharp, Steve M.; Holstrom, John R.; Gain, Lorand H., Jr.; and Ballun, John V., 4,708,160, Cl. 137-368.000.

Balquet, Robert; Baubeau, Robert; Bertrand, Jean-Paul; Guezou, Jean-Pierre; and Carron, Philippe, to L'Etat Francais represente par le Delegue General pour l'Armement. Hull shapes for surface effect ship with side walls and two modes of operation. 4,708,077, Cl. 114-67.00A.

Bandyopadhyay, Gautam; French, Kenneth W.; Bowen, Leslie J.; and Neil, Jeffrey T., to GTE Laboratories Incorporated. Method for fabricating large cross section injection molded ceramic shapes. 4,708,838, Cl. 264-63.000.

Bangs, Richard G.; and Grey, Michael O., to NCR Corporation. Thermal printer. 4,708,500, Cl. 400-120.000.

Banker, Dennis C.; Dorler, Jack A.; and Hryckowian, John N., to International Business Machines Corporation. Complementary cascoded logic circuit. 4,709,166, Cl. 307-441.000.

Banno, Shigeki; Oshibe, Yoshihiro; and Nakagawa, Yoshimasa, to Nippon Oil and Fats Co., Ltd. Cured unsaturated polyester resin or vinyl ester resin containing fluorine-containing groups oriented on its surface. 4,708,982, Cl. 525-92.000.

Banon, Louis; Lajoie-Mazenc, Michel; and Mathieu, Pierre, to Regie Nationale des Usines Renault. Permanent-magnet six-pole synchronous electrodynamic machine. 4,709,179, Cl. 310-156.000.

Banyay, H. Daniel, to Robinson Industries, Inc. Surgeless combustion air blower. 4,708,593, Cl. 416-183.000.

Barkett, Patricia A.; and Clapp, Michael G. Calculator-computer for calculating infusion rates over varying time intervals. 4,709,331, Cl. 364-413.000.

Barks, Robert W. Method of sealing leaks in a cooling system. 4,708,195, Cl. 165-1.000.

Barlow, Arthur J.: *See*—
Dye, Malcolm S.; and Barlow, Arthur J., 4,708,479, Cl. 356-350.000.

Barner, Richard; and Hubscher, Josef, to Hoffmann-La Roche Inc. (Alkoxy-methyl)-phenyl-methyl-epoxybutanes. 4,709,055, Cl. 549-215.000.

Baron, Claude, to Societe Nationale Industrielle et Aerospatiale. Safety tool-holder for machine-tools. 4,708,547, Cl. 409-233.000.

Baron, Howard C. Atraumatic vascular balloon clamp. 4,708,140, Cl. 128-325.000.

Barre-Sinoussi, Francoise: *See*—
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435–5.000.

Barresi, Anthony J.: *See*—
Nelson, Leonard; and Barresi, Anthony J., 4,708,281, Cl. 228-180.100.

Bart, Hansueli: *See*—
Mesenich, Gerhard; Bart, Hansueli; and Alsbrook, Daniel E., 4,708,117, Cl. 123-533.000.

Barta, Istvan: *See*—
Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Nagy, Mihaly; and Bacskai, Gyorgy, 4,708,733, Cl. 71-94.000.

BASF Aktiengesellschaft: *See*—
Grenacher, Armin V.; Strohmeyer, Max; Hoffmann, Herwig; and Elliehausen, Heinrich, 4,709,105, Cl. 568-883.000.
Hoelderich, Wolfgang; Merger, Franz; and Fischer, Rolf, 4,709,097, Cl. 568-443.000.
Merger, Franz; Hutmacher, Hans-Martin; Hettinger, Peter; Voges, Dieter; and Lengsfeld, Wolfgang, 4,709,072, Cl. 558-450.000.
Rentzea, Costin; Buschmann, Ernst; Himmele, Walter; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,708,960, Cl. 514-383.000.
Schaeffer, Norbert; Bettinger, Gunter; Goetz, Klaus; Pfefferkorn, Dietmar; Burkle, Ottmar; Schmidts, Kurt; Schneider, Pierre; Wagner, Werner; Wietholter, Dieter; Dietze, Herbert; and Andriessen, Wilhelmus, 4,709,288, Cl. 360-130.210.
Schirmer, Ulrich; Karbach, Stefan; Pommer, Ernst-Heinrich; Ammermann, Eberhard; Steglich, Wolfgang; Schwalge, Barbara A. M.; and Anke, Timm, 4,709,078, Cl. 560-060.000.
Schoettle, Klaus; Sold, Roland; Brinkmann, Uwe; and Wagner, Werner, 4,709,290, Cl. 360-132.000.
Sperling, Karin; and Fischer, Martin, 4,709,109, Cl. 585-438.000.

BASF Corporation: *See*—
Donegan, Thomas E.; and Leary, Timothy G., 4,709,021, Cl. 540-141.000.
Panek, Edward J.; and Davis, Pauls, 4,709,099, Cl. 568-624.000.

Basler, Urs: *See*—
Block, Franz-Rudolf; Theissen, Wolfgang; Basler, Urs; and Pesovic, Branislav, 4,708,191, Cl. 164-150.000.

Batalden, Glenn D.: *See*—
Anthony, Bruce O., Jr.; Batalden, Glenn D.; Mitchell, Glen R.; Schloss, Phillip C.; and Wells, David K., 4,709,328, Cl. 364-200.000.

Bathelt, Heinrich; Ehrl, Winfried; Wehowsky, Frank; Kleber, Rolf; Lotz, Werner; Glenz, Wolfgang; Herdt, Hubert; Jackel, Lothar; Mast, Jan-Hilbert; Hintermeier, Karl; and Muller, Manfred, to Hoechst Aktiengesellschaft. Urethanes containing perfluoroalkyl and epichlorohydrin groups. 4,709,074, Cl. 560-33.000.

Baubeau, Robert: *See*—
Balquet, Robert; Baubeau, Robert; Bertrand, Jean-Paul; Guezou, Jean-Pierre; and Carron, Philippe, 4,708,077, Cl. 114-67.00A.

Baumann, William M.: *See*—
Scott, Ray V., Jr.; Baumann, William M.; and House, David W., 4,709,003, Cl. 528-60.000.

Baur, Rolf; and Gruber, Bernhard, to Anton Steinecker Maschinenfabrick GmbH. Rotary disc filter element. 4,708,797, Cl. 210-330.000.

Baurand, Gilles; Fouret, Rene; and Rundsztuk, Marek, to La Telemecanique Electrique. Inductive sensor for current measurement. 4,709,205, Cl. 324-127.000.

Bawden, Alan: *See*—
Hillis, W. Daniel; Knight, Thomas F., Jr.; Bawden, Alan; Kahle, Brewster L.; Chapman, David; Christman, David P.; Lasser, Cliff A.; and Feynman, Carl R., 4,709,327, Cl. 364-200.000.

Baxter, Gordon D.; and Grant, James C., to Northern Telecom Limited. Method and apparatus for insulating electrical conductor. 4,708,837, Cl. 264-40.400.

Baxter, Gordon D.; Grant, James C.; and Garner, John N., to Northern Telecom Limited. Method for coloring polymer-insulated wire. 4,708,887, Cl. 427-118.000.

Baxter Travenol Laboratories, Inc.: *See*—
Posey, John L.; and Schmidt, Josef, 4,708,045, Cl. 83-604.000.

Bayat, John J. Sprinkler control system. 4,708,162, Cl. 137-382.000.

Bayer Aktiengesellschaft: *See*—
Angerbauer, Rolf, 4,709,023, Cl. 540-224.000.
Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Bae, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hanssler, Gerd, 4,708,731, Cl. 71-90.000.
Ingendoh, Axel; Meyer, Horst; and Garthoff, Bernward, 4,709,031, Cl. 544-333.000.
Rolf, Meinhard; Neeff, Rutger; and Muller, Walter, 4,709,019, Cl. 534-655.000.

Bazan, Alberto; and Murphy, Donald M. Dual diaphragm pump. 4,708,601, Cl. 417-393.000.

Beale International Technology Limited: *See*—
Beale, Nicholas C. L.; Rushbrooke, Roger W.; and Gladstone, Philip J. S., 4,709,365, Cl. 371-11.000.

Beale, Nicholas C. L.; Rushbrooke, Roger W.; and Gladstone, Philip J. S., to Beale International Technology Limited. Data transmission system and method. 4,709,365, Cl. 371-11.000.

Bear Island Paper Company: *See*—
Beaulieu, Serge B., 4,708,771, Cl. 162-83.000.

Beaty, William G. Extendible hose assembly for service truck. 4,708,179, Cl. 141-388.000.

Beaudet, Paul R., to Westinghouse Electric Corp. CCD focal plane array convolver. 4,709,381, Cl. 377-62.000.

Beaulieu, Serge B., to Bear Island Paper Company. Two stage process for sulfonating mechanical pulp fibers. 4,708,771, Cl. 162-83.000.

Becker, Gert, to Overbeck GmbH & Co. Process for attaching drinking straws to packaging containers and apparatus for carrying out the process. 4,707,965, Cl. 53-410.000.

Becker, Hansjoerg: *See*—
Schilling, Hartmut; Peller, Helmuth; and Becker, Hansjoerg, 4,708,065, Cl. 102-529.000.

Beckmann, Friedrich-Karl; Hoppe, Wolfgang; and Knochel, Reinhard, to U.S. Philips Corporation. Optical time-domain reflectometer using heterodyne reception. 4,708,471, Cl. 336-73.100.

Bednarz, James P.; and Freedman, David D., to RCA Corporation. Semiconductor laser driver circuit. 4,709,370, Cl. 372-38.000.

Beiersdorf A.G.: *See*—
Sanders, Bernard, 4,709,399, Cl. 383-66.000.

Beisemann, Heinz: *See*—
Reifenhauser, Hans; Reitemeyer, Paul; Krumm, Klemens; and Beisemann, Heinz, 4,708,618, Cl. 425-133.500.

Bekker, Alex Y.: *See*—
Bellet, Richard J.; Broyer, Ephraim; Bekker, Alex Y.; and Lace, Melvin A., 4,708,839, Cl. 264-85.000.

Belart, Juan; Seibert, Wolfram; and Ocvirk, Norbert, to Alfred Teves GmbH. Brake pressure generator for a hydraulic brake system for use with motor vehicles. 4,708,405, Cl. 303-114.000.

Belka, Heinrich, to ESGE-Marby GmbH & Co. KG. Environmentally protected electrical contact terminal arrangement for a plastic-metal-plastic laminated cycle fender. 4,708,665, Cl. 439-551.000.

Beller, I.: *See*—
Beller, Isi; and Fradin, Boris, 4,708,657, Cl. 434-185.000.

Beller, Isi; and Fradin, Boris, to Beller, I. Audio-frequency converter apparatus, for treating subjects suffering from audio-phonatory and auditive-verbal disorders, and a method of using the apparatus. 4,708,657, Cl. 434-185.000.

Bellet, Richard J.; Broyer, Ephraim; Bekker, Alex Y.; and Lace, Melvin A., to Amphenol Corporation. Method of compressively molding articles from resin coated filler materials. 4,708,839, Cl. 264-85.000.

Beltway Construction, Inc.: *See*—
Bills, Randall C.; Bumgardner, Teddy E.; Monroe, Lusbert L.; and Zimmermann, Jeffery D., 4,708,222, Cl. 187-1.00R.

Bement, Laurence J.; and Bailey, James W., to United States of America, Administrator, National Aeronautics & Space Administration. Tool and process for miniature explosive joining of tubes. 4,708,280, Cl. 228-107.000.

Bender, Albert; and Guenther, Dieter, to Hoechst Aktiengesellschaft. Ketosultams. 4,709,026, Cl. 544-3.000.

Benigno, Carl. Apparatus for entrapping and restraining a game farm bird. 4,707,943, Cl. 43-61.000.

Bennett, John E.: *See*—
Mitchell, Thomas A.; Bennett, John E.; Brown, Claude M.; and Pohto, Gerald R., 4,708,888, Cl. 427-126.100.

Bennett, Roy L.; Ciancioni, James A.; and Clark, William U. Vari-scale. 4,707,928, Cl. 33-491.000.

Benteler Corporation: *See*—
Palentyn, Gunther H.; Dehlinger, James R.; and Rigsby, Donald R., 4,708,390, Cl. 276-188.000.

Bentz, L. Earl; and Summerford, Roark H. Boat stabilizer. 4,708,672, Cl. 440-51.000.

Berg, Arne, to Stiftelsen for Industriell og Teknisk Forskning ved Norges Tekniske Hogskle (SINTEF). Fiber optic connector including automatic wiping mechanism. 4,708,432, Cl. 350-96.210.

Berg, Otto, to Ardal OG Sunndal Verk A.S. Method of calibrating vehicle wheels to a finished size. 4,708,749, Cl. 148-11.50A.

Berger, Antoine: *See*—
Deux, Alain; Merant, Jean-Camille; Gibert, Francois; and Berger, Antoine, 4,707,973, Cl. 56-328.00R.

Berger, Johann: *See*—
Berger, Josef; and Berger, Johann, 4,708,003, Cl. 66-192.000.

Berger, Josef; and Berger, Johann. Crochet tools for producing strips on a crochet galloon machine. 4,708,003, Cl. 66-192.000.

Bergman, Sten G. A.; Sagefors, K. Ivar; and Akesson, Bengt A., to Boliden Aktiebolag. Storage complex for storing radioactive material in rock formation. 4,708,522, Cl. 405-55.000.

Berkowitz, Gerard: *See*—
Soderbaum, Mavis, 4,708,357, Cl. 280-289.00H.

Bernacchi, Armand. Anti-theft device for an automobile vehicle. 4,708,005, Cl. 70-238.000.

Berry, Ira R.: *See*—
Cohen, Jonathan M.; Berry, Ira R.; and Borkan, Lionel, 4,708,834, Cl. 264-4.300.

Berthet, Hubert; and Laugier, Noel, to Institut Francais du Petrole. Connection system between a main body and a super-structure. 4,708,526, Cl. 405-202.000.

Bertrand, Jean-Paul: *See*—
Balquet, Robert; Baubeau, Robert; Bertrand, Jean-Paul; Guezon, Jean-Pierre; and Carron, Philippe, 4,708,077, Cl. 114-67.00A.

Berwick, Martin A.: *See*—
Myers, Drewfus Y., Jr.; Alexandrovich, Peter S.; Pearce, Glenn T.; Santilli, Domenic; Sreekumar, Chandrasekha; Berwick, Martin A.; Upson, Donald A.; and Goebel, William K., 4,708,923, Cl. 430-112.000.

Besemann, Alfred, to E.C.H. Will (GmbH & Co.). Method and apparatus for zig-zag folding webs of paper and the like. 4,708,332, Cl. 270-39.000.

Besik, Ferdinand, to Canadian Gas Research Institute. Apparatus for balanced heat recovery ventilation - heating - humidification - dehumidification - cooling and filtration of air. 4,708,000, Cl. 62-480.000.

Bessler, Roger F.; Arbeiter, James H.; and Sinniger, Joseph O., to RCA Corporation. Multiplexed real-time pyramid signal processing system. 4,709,394, Cl. 382-49.000.

Bestobell Sparling Limited: *See*—
Johnson, Rodney C., 4,708,022, Cl. 73-861.280.

Bethea, James R.; and Knight, Clifton T., to Dow Chemical Company, The. Low pressure drop, modular coextrusion feedblock. 4,708,615, Cl. 425-131.100.

Bethlehem Steel Corporation: *See*—
Fountoulakis, Stavros G.; Steinbicker, Richard N.; Hruskoci, Daniel E.; and Singh, Rajesh K., 4,708,779, Cl. 204-27.000.

Bettinger, Gunter: *See*—
Schaeffer, Norbert; Bettinger, Gunter; Goetz, Klaus; Pfefferkorn, Dietmar; Burkle, Ottmar; Schmidts, Kurt; Schneider, Pierre; Wagner, Werner; Wietholter, Dieter; Dietze, Herbert; and Andriessen, Wilhelmus, 4,709,288, Cl. 360-130.210.

Betz Laboratories, Inc.: *See*—
Chen, Fu; and Bair, Keith A., 4,708,815, Cl. 252-181.000.

Bews, Brian; Critchley, Peter; Durrant, James A.; Stebles, Malcolm R. D.; and Tipping, Leigh R. H., to Lever Brothers Company. Deodorant compositions. 4,708,863, Cl. 424-47.000.

Beynet, Pierre A.; and von Aschwege, J. Thomas, to Amoco Corporation. Multiterminators for riser pipes. 4,708,525, Cl. 405-195.000.

BICC Public Limited Company: *See*—
Allard, Vincent L.; and Gallard, Henry, 4,708,298, Cl. 242-25.00A.

Bickes, Robert W., Jr.; and Schwarz, Alfred C., to United States of America, Energy. Semiconductor bridge (SCB) igniter. 4,708,060, Cl. 102-202.700.

Bierce, Laurence M.: *See*—
Shaw, Mark D.; Heyman, J. Tad; and Bierce, Laurence M., 4,708,258, Cl. 220-288.000.

Bigler, Mont D.; and Harsh, Jack L. System and method for dispensing frozen foods. 4,707,997, Cl. 62-341.000.

Bihari, Ferenc: *See*—
Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Nagy, Mihaly; and Bacskai, Gyorgy, 4,708,733, Cl. 71-94.000.

Bihn, Robert F.: *See*—
Lindquist, Craig B.; and Bihn, Robert F., 4,708,667, Cl. 439-788.000.

Billings, Chris L. Mooring device for boats. 4,708,083, Cl. 114-230.000.

Bills, Randall C.; Bumgardner, Teddy E.; Monroe, Lusbert L.; and Zimmermann, Jeffery D., to Beltway Construction, Inc. Protective elevator systems. 4,708,222, Cl. 187-1.00R.

Binder, Rolf; and Schlepfer, Walter, to Maschinenfabrik Rieter AG. Method and arrangement for extracting fiber flocks from textile fiber bales. 4,707,888, Cl. 19-80.00R.

Bio Techniques Laboratories, Inc.: *See*—
Huber, Neil M., 4,708,879, Cl. 426-335.000.

Biochemie: *See*—
Ascher, Gerd; and Riedl, Kurt, 4,708,825, Cl. 2600-544.00N.

Birtcher Corporation, The: *See*—
Abdelghani, Ali A., 4,708,127, Cl. 128-24.00A.

Bisping, Bernhard; Gersbach, Klaus; and Romer, Rudolf, to Rheinmetall GmbH. Impact projectile. 4,708,064, Cl. 102-517.000.

Bizer, Jerry L.; and Carrig, Raymond D., Jr. Instrument for determining the setting of a lens edger device to produce a properly sized lens. 4,707,929, Cl. 33-507.000.

Bjork, Jan; and Svensson, Sven G. Arming device for sea mines. 4,708,062, Cl. 102-420.000.

Bjorkman, Rune: *See*—
Axen, Rolf E.; Kaj, Goran L.; and Bjorkman, Rune, 4,708,932, Cl. 435-7.000.

Black & Decker Inc.: *See*—
Saeed, Abdul, 4,707,910, Cl. 29-596.000.
Black, Elizabeth, executrix: *See*—
Black, Seymour, deceased, 4,708,241, Cl. 206-63.300.
Black, Seymour, deceased (by Black, Elizabeth, executrix), to American Cyanamid Company. Suture package. 4,708,241, Cl. 206-63.300.
Blanchard, Richard A., to Siliconix Incorporated. Manufacture of trimmable high value polycrystalline silicon resistors. 4,707,909, Cl. 437-109.000.
Blank, Richard E.; Tien, Albert F.; and Amith, Avraham, to ITT Electro Optical Products, a division of ITT Corporation. Method of measuring the temperature of a photocathode. 4,708,677, Cl. 445-3.000.
Blatherwick, William J.: *See*—
Holewinski, Robert D.; Blatherwick, William J.; Hamilton, Leslie; and Wells, Thomas E., Sr., 4,708,650, Cl. 433-90.000.
Blee, Leonard J. Marine hull. 4,708,085, Cl. 114-290.000.
Block, Franz-Rudolf; Theissen, Wolfgang; Basler, Urs; and Pesovic, Branislav, to Stopinc Aktiengesellschaft. Apparatus for indicating the level in metallurgical vessels by electromagnetic means. 4,708,191, Cl. 164-150.000.
Block, Peter C.: *See*—
Pfeiler, Manfred; Seissl, Johann; and Block, Peter C., 4,709,385, Cl. 378-99.000.
Blomberg Robotertechnik GmbH: *See*—
Richter, Hans, 4,708,578, Cl. 414-720.000.
Blue Bell, Inc.: *See*—
Kellogg, Robert L.; Zimmerman, Roger W.; and Bryan, Carney J., 4,708,073, Cl. 112-262.300.
Blue Box Toy Factory Limited: *See*—
Udagawa, Yoshio, 4,708,685, Cl. 446-139.000.
Blumler, Norbert: *See*—
Busen, Dietmar; Schluter, Helmut; Weghmann, Arnold; Blumler, Norbert; and Tecl, Bohuslav, 4,708,756, Cl. 156-143.000.
Board of Governors of Wayne State University, The: *See*—
Rossmoore, Harold W., 4,708,808, Cl. 252-11.000.
Board of Regents, The University of Texas, The: *See*—
Linner, John G.; and Livesey, Stephen, 4,707,998, Cl. 62-349.000.
Bober, Henry T.; and Doery, Michael S., to Xerox Corporation. Interactive system for signature production. 4,708,469, Cl. 355-77.000.
Bobrick Washroom Equipment, Inc.: *See*—
Keck, Henry C.; and Fujitaki, Roy K., 4,707,933, Cl. 34-97.000.
Bockrath, Richard E.; and Kirksey, Kirby, to Du Pont de Nemours, E. I., and Company. Destruction of nitrated aromatics. 4,708,806, Cl. 210-754.000.
Boden, Karl; Ibach, Harald; and Linke, Udo, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Method of and apparatus for growing crystals. 4,708,764, Cl. 156-617.00R.
Boeckmann, Hugo; Huff, Glenn E.; and Tilman, Paul A., to Illinois Tool Works Inc. Carrier tape. 4,708,245, Cl. 206-330.000.
Boehringer Mannheim GmbH: *See*—
Rauscher, Elli; Schaich, Eugen; Neumann, Ulrich; Wahlefeld, August; Gruber, Wolfgang; and Empl, Bernhard, 4,709,020, Cl. 536-17.800.
Siedel, Joachim; Staepels, Johnny; and Ziegenhorn, Joachim, 4,708,939, Cl. 436-13.000.
Boers, Arie, to Micafil, Inc. Armature winding machine with removable collet and shrouds. 4,708,297, Cl. 242-7.05B.
Bohus, Peter: *See*—
Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Nagy, Mihaly; and Bacskai, Gyorgy, 4,708,733, Cl. 71-94.000.
Boliden Aktiebolag: *See*—
Bergman, Sten G. A.; Sagefors, K. Ivar; and Akesson, Bengt A., 4,708,522, Cl. 405-55.000.
Sagefors, Karl I.; and Persson, Per G., 4,708,523, Cl. 405-55.000.
Bombardelli, Ezio; Gabetta, Bruno; and Conti, Marisa, to Inverni Della Beffa SpA. Methods, compositions and compounds for the treatment of prostatic adenoma. 4,709,076, Cl. 560-55.000.
Bondico, Inc.: *See*—
Shaw, Mark D.; Heyman, J. Tad; and Bierce, Laurence M., 4,708,258, Cl. 220-288.000.
Bonner, Billie M.: *See*—
Bonner, Wayman A.; and Bonner, Billie M., 4,707,939, Cl. 40-591.000.
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Bonnet, Michel: *See*—
Tkatchenko, Igor; Jaouhari, Rabih; Bonnet, Michel; Dawkins, Gordon; and Lecolier, Serge, 4,709,087, Cl. 560-339.000.
Bopst, John H., III; and Zakro, Joyce M. System for automatic measuring and dispensing of grain and powder food products. 4,708,265, Cl. 222-43.000.
Bordenave, John R. P., to Lockheed Missiles & Space Company, Inc. Rugged multimode antenna. 4,709,240, Cl. 343-772.000.
Borg-Warner Automotive, Inc.: *See*—
Cole, Edward H., Jr., 4,708,701, Cl. 474-245.000.
Borkan, Lionel: *See*—
Cohen, Jonathan M.; Berry, Ira R.; and Borkan, Lionel, 4,708,834, Cl. 264-4.300.
Born, Gerhard; and Kaiser, Klaus, to Seitz Enzinger Noll Maschinenbau Aktiengesellschaft. Arrangement for converting a multi-track stream of bottles into a single-track stream of bottles. 4,708,234, Cl. 198-453.000.
Bornhorst, James M., to Vari-Lite, Inc. Lens carrier. 4,709,311, Cl. 362-277.000.
Bossand, Bernard: *See*—
Grangette, Henri; Llinares, Michel; Bossand, Bernard; and Faure, Alain, 4,708,720, Cl. 44-51.000.
Boston S.p.A.: *See*—
Flutti, Fulvio; and Ghezzi, Franco, 4,708,907, Cl. 428-352.000.
Boumendil, Jean-Jack: *See*—
Pescatore, Richard; and Boumendil, Jean-Jack, 4,708,645, Cl. 432-152.000.
Bourbon, Jean, to Ets. A. Bourbon et Fils. Latching storage/display box for diskettes or the like. 4,708,239, Cl. 206-45.130.
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Tacker, Willis A., Jr.; Bourland, Joe D.; Babbs, Charles F.; and Geddes, Leslie A., 4,708,145, Cl. 128-419.00D.
Bouteiller, Harold L. Apparatus for casting and inverting concrete products. 4,708,611, Cl. 425-62.000.
Bowen, Leslie J.: *See*—
Bandyopadhyay, Gautam; French, Kenneth W.; Bowen, Leslie J.; and Neil, Jeffrey T., 4,708,838, Cl. 264-63.000.
Braceras, George M.; and Dreibelbis, Jeffrey H., to International Business Machines Corporation. Off-chip driver circuits. 4,709,162, Cl. 307-270.000.
Bradshaw, Thomas I.: *See*—
Orensteen, Bruce D.; and Bradshaw, Thomas I., 4,708,920, Cl. 430-11.000.
Brake, David W.: *See*—
Skach, Edward J., Jr.; Brake, David W.; and Waibel, Joseph H., 4,708,737, Cl. 75-58.000.
Bramlage Gesellschaft mit beschrankter Haftung: *See*—
Sieverding, Werner; Mettenbrink, Herbert; Pohlmann, Gunter; and Hackmann, Ludger, 4,708,267, Cl. 222-211.000.
Branemark, Per-Ingvar, to Institute for Applied Biotechnology, The. Positive cast model of an upper and lower jaw, and a method and means for producing such a model. 4,708,654, Cl. 433-213.000.
Branon, David E., to McKnight Road Enterprises, Inc. Clothing with illuminated display. 4,709,307, Cl. 362-103.000.
Branovich, Louis E.; Freeman, Gerard L.; and Smith, Bernard, to United States of America, Army. Method of making a long lived high current density cathode from tungsten and iridium powders. 4,708,681, Cl. 445-50.000.
Braud, Societe Anonyme: *See*—
Deux, Alain; Merant, Jean-Camille; Gibert, Francois; and Berger, Antoine, 4,707,973, Cl. 56-328.00R.
Braun, Hans; and Schneider, Georg, to Endress u. Hauser GmbH u. Co. Arrangement for contactless measurement of the velocity of a moving medium. 4,708,021, Cl. 73-861.060.
Braunstein, David M.: *See*—
Fitzgerald, Maurice E.; Braunstein, David M.; Alkaitis, Saulius A.; and Pinsky, Naum, 4,708,918, Cl. 429-210.000.
Bray, James W., to Champion International Corporation. Ultrafiltration system with regeneration control. 4,708,790, Cl. 210-87.000.
Braychak, Joseph J.; and Casey, John P., Sr., to USM Corporation. Large secondary head rivet. 4,708,553, Cl. 411-34.000.
Brazier, John F.; Young, Alan H.; Viney, John E.; and Sutton, Gordon W., to Tauranca Limited. Fluid fuel fired burner. 4,708,638, Cl. 431-116.000.
Brazil, Michael J., to Sealright Co., Inc. Reinforcing ring construction for containers. 4,708,283, Cl. 229-5.500.
Brendel, Josef: *See*—
Wenske, Hanno; Gallien, Arnold; Kauschinger, Martin; Unger, Klaus; Brendel, Josef; and Lampe, Lutz, 4,709,182, Cl. 310-316.000.
Brickl, Rolf; Schepky, Gottfried; Rupprecht, Eckhard; and Greischel, Andreas, to Dr. Karl Thomae GmbH. Oral anti-diabetic pharmaceutical forms and the preparation thereof. 4,708,868, Cl. 924-80.000.
Bridgestone Corporation: *See*—
Umezawa, Yujiro, 4,707,975, Cl. 57-212.000.
Yoda, Yasutada; Sueyasu, Seisuke; and Futamura, Shoji, 4,708,609, Cl. 425-28.00D.
Bridgestone Tire Company Limited: *See*—
Imai, Isamu; Oshima, Kazuo; Tanaka, Kenichi; and Inada, Norio, 4,708,185, Cl. 152-451.000.
Brigham & Women's Hospital: *See*—
Remold, Heinz G., 4,708,937, Cl. 435-188.000.
Bril, Thijs W., to Signetics Corporation. Method for providing a semiconductor device with planarized contacts. 4,708,767, Cl. 437-18.000.
Brinkmann, Uwe: *See*—
Schoettle, Klaus; Sold, Roland; Brinkmann, Uwe; and Wagner, Werner, 4,709,290, Cl. 360-132.000.
Bristol-Meyers Company: *See*—
Konishi, Masataka; Saitoh, Kyoichiro; Ohkuma, Hiroaki; and Kawaguchi, Hiroshi, 4,708,872, Cl. 424-115.000.
Bristol-Myers Company: *See*—
Iimura, Seiji; Abe, Yoshio; Okumura, Jun; Naito, Takayuki; and Kamachi, Hajime, 4,708,955, Cl. 514-202.000.
British Aerospace PLC: *See*—
Dye, Malcolm S.; and Barlow, Arthur J., 4,708,479, Cl. 356-350.000.
British Telecommunications public limited company: *See*—
Fox, John R.; Powter, Edwin J.; and Ritchie, William K., 4,709,418, Cl. 455-612.000.
Brockmeyer, Jerry W.; Aubrey, Leonard S.; Dore, James E.; and Soble, Clifford N., to Swiss Aluminium Ltd. Vented pouring cup for molten metal casting. 4,708,326, Cl. 266-159.000.
Brodowski, Walter: *See*—
Diamantoglou, Michael; Magerlein, Helmut; Brodowski, Walter;

Grimm, Wolfgang; and Meyer, Gerhard, 4,708,985, Cl. 525-166.000.
Brogdon, J. William: *See*—
McEachern, J. Albert, Jr.; and Brogdon, J. William, 4,708,602, Cl. 417-407.000.
Brokaw, Adrian P., to Analog Devices, Inc. Three-state output buffer with anti-saturation control. 4,709,167, Cl. 307-443.000.
Brokke, Mervin E.: *See*—
Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,708,735, Cl. 71-118.000.
Bromine Compounds Ltd.: *See*—
Hermolin, Joshua; and Kampf, Arieh, 4,709,100, Cl. 568-639.000.
Brongersma, Hidde H.: *See*—
Dirks, Albertus G.; and Brongersma, Hidde H., 4,709,363, Cl. 369-275.000.
Bronowski, Helmut; and Dahlke, Christian, to J.M. Voith GmbH. Cover for turbines and pumps. 4,708,590, Cl. 415-219.00C.
Broussoux, Dominique; and Micheron, Francois, to Thomson-CSF. Polymer based dielectric material with high dielectric permittivity. 4,708,989, Cl. 525-199.000.
Brown Boveri Reaktor GmbH: *See*—
Haller, Hans, 4,707,912, Cl. 29-726.000.
Brown, Claude M.: *See*—
Mitchell, Thomas A.; Bennett, John E.; Brown, Claude M.; and Pohto, Gerald R., 4,708,888, Cl. 427-126.100.
Brown, Gregory D., to Technical Oil Tools Corporation. Drilling mud density probe. 4,708,018, Cl. 73-439.000.
Brown, Robert L.: *See*—
Davin, Donald R.; and Brown, Robert L., 4,708,519, Cl. 404-101.000.
Brown, Thomas E., Jr. Boat anchor. 4,708,086, Cl. 114-294.000.
Brown, Wallace L.; and Madamba, O. Mark, to Ver-Val Enterprises, Inc. Munitions assembly system. 4,708,048, Cl. 89-1.805.
Brown, Walter F. M.: *See*—
McGregor, Ian R.; Jackson, D. Keith; Brown, Walter F. M.; and Burrell, Kenneth, 4,708,775, Cl. 203-40.000.
Brown, William M.: *See*—
Sutherland, Robert L.; and Brown, William M., 4,708,284, Cl. 229-48.00R.
Brown & Williamson Tobacco Corporation: *See*—
Lamb, Charles G.; and McMurtrie, Andrew, 4,708,150, Cl. 131-336.000.
Browning, Robert A., Jr.; Ely, Gary W.; and Hayes, Leonard L., to Coe Manufacturing Company, The. Large diameter nose bar roll apparatus for veneer lathe with automatic knife gap adjustment during peeling. 4,708,180, Cl. 144-213.000.
Broyer, Ephraim: *See*—
Bellet, Richard J.; Broyer, Ephraim; Bekker, Alex Y.; and Lace, Melvin A., 4,708,839, Cl. 264-85.000.
Brugger, Werner, to Gebruder Buhler AG. Machine for molding articles by injection molding or die casting. 4,708,620, Cl. 425-154.000.
Brumage, John. Stereoscopic imaging apparatus and methods. 4,709,263, Cl. 358-88.000.
Brun-Vezinet, Francoise: *See*—
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435–5.000.
Brunett, Juanita L. Apparatus for supporting and storing engineering drawings and the like. 4,708,509, Cl. 402-4.000.
Bruninga, Kenneth J., to L. R. Nelson Corporation. Water timer. 4,708,264, Cl. 222-20.000.
Brunke, Ernst-Joachim; and Struwe, Hartmut, to DRAGOCO Gerberding & Co. GmbH. Mixtures of dimethyl-tricyclo (5.2.1.02,6) decane derivatives together with their preparation and use as a scent- and flavor materials. 4,709,061, Cl. 549-544.000.
Bruno, Edward C. Produce bag with tie tails. 4,709,400, Cl. 383-77.000.
Brunswick Corporation: *See*—
Amaya, German, 4,708,741, Cl. 75-251.000.
Anderson, Robert D.; Estes, John D.; Carta, John; and Page, Gilbert J., 4,707,953, Cl. 52-63.000.
Bryan, Carney J.: *See*—
Kellogg, Robert L.; Zimmerman, Roger W.; and Bryan, Carney J., 4,708,073, Cl. 112-262.300.
Buchanan, L. Stephen. Endodontic root canal file bending pliers. 4,708,651, Cl. 433-157.000.
Budapesti Vegyimuvek: *See*—
Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Nagy, Mihaly; and Bacskai, Gyorgy, 4,708,733, Cl. 71-94.000.
Buechel, Franz, to Hilti Aktiengesellschaft. Explosive powder charge operated driving device. 4,708,061, Cl. 102-331.000.
Buisson, Claude; and Delafoy, Jean-Alain, to Societe Nationale d'Exploitation Industrielle des Tabacs et Allumettes. Process and device for supplying an operation station with a succession of guided articles. 4,708,237, Cl. 198-726.000.
Buljan, Sergei-Tomislav V.; Lingertat, Helmut; Baldoni, J. Gary, II; and Sarin, Vinod K., to GTE Laboratories Incorporated. Coated cemented carbide tool for steel roughing applications and methods for machining. 4,708,037, Cl. 82-1.00C.
Bullock, Christopher A. Ceiling insulation and method of installation. 4,707,960, Cl. 52-404.000.
Bultman, Marten; and Wilding, Edwin L., to Griffin & Company, Inc. Cleated channel belt conveyor. 4,708,238, Cl. 198-835.000.
Bumgardner, Teddy E.: *See*—
Bills, Randall C.; Bumgardner, Teddy E.; Monroe, Lusbert L.; and Zimmermann, Jeffery D., 4,708,222, Cl. 187-1.00R.
Burcham, James T.: *See*—
Woods, Theodore E.; Cole, Jimmy R.; and Burcham, James T., 4,709,355, Cl. 367-16.000.
Burger, Kurt; Friedrich, Heinz; Molkner, Thomas; and Schottle, Peter, to Robert Bosch GmbH. Temperature dependent electric resistor probe and a method of making the same. 4,708,769, Cl. 156-659.100.
Burkle, Ottmar: *See*—
Schaeffer, Norbert; Bettinger, Gunter; Goetz, Klaus; Pfefferkorn, Dietmar; Burkle, Ottmar; Schmidts, Kurt; Schneider, Pierre; Wagner, Werner; Wietholter, Dieter; Dietze, Herbert; and Andriessen, Wilhelmus, 4,709,288, Cl. 360-130.210.
Burlington Northern Railroad Co.: *See*—
Twogood, Rodney L.; Wright, Raymond L.; and Rawle, Roger D., 4,707,900, Cl. 29-244.000.
Burney, Burrell T., to Peterson Manufacturing Co., Inc. Locking hole punch. 4,707,924, Cl. 30-363.000.
Burough, Irvin G.; Pellissier, Robert O.; and Johnson, Kenneth W. Method and apparatus for detecting gas. 4,709,150, Cl. 250-338.000.
Burr, James D. Motor control for telescope. 4,709,178, Cl. 310-80.000.
Burrell, Kenneth: *See*—
McGregor, Ian R.; Jackson, D. Keith; Brown, Walter F. M.; and Burrell, Kenneth, 4,708,775, Cl. 203-40.000.
Buschmann, Ernst: *See*—
Rentzea, Costin; Buschmann, Ernst; Himmele, Walter; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,708,960, Cl. 514-383.000.
Busen, Dietmar; Schluter, Helmut; Weghmann, Arnold; Blumler, Norbert; and Tecl, Bohuslav, to Carl Freudenberg, Firma. Process of producing a pliable roller. 4,708,756, Cl. 156-143.000.
Bustos, Rafael T.; and Taylor, William B., to Clairson International. Expansible mounting assembly. 4,708,552, Cl. 411-60.000.
Butzen, William J. Roof edge fascia system. 4,707,954, Cl. 52-96.000.
B.V. Koninklijke Maatschappij "De Schelde": *See*—
Van Den Berg, Frans J.; and Viergever, Robert A., 4,708,563, Cl. 414-22.000.
Bylehn, Bo V. S.; and Granqvist, Iage H., to Sunds Defibrator Aktiebolag. Apparatus for the removal of impurities from fiber suspensions. 4,708,829, Cl. 261-62.000.
Byrns, James E. Insulated bottle holder. 4,708,254, Cl. 215-13.100.
Bytheway, Mervin H., Jr. Cable ladder system and improved V-closure blinds. 4,708,188, Cl. 160-174.000.
C.E.T. Construction Eng'g. & Technology Ltd.: *See*—
Kuoni, Xaver, 4,708,447, Cl. 352-128.000.
C & F Stamping Co., Inc.: *See*—
Arend, Donald P., 4,708,625, Cl. 425-589.000.
Cabado, Ramon B., to Henkel Kommanditgesellschaft auf Aktien. Process for phosphating metal surfaces and especially iron surfaces. 4,708,744, Cl. 106-14.120.
Cahill, Joseph, Jr.; and Rodenberg, Herbert G., to National Distillers and Chemical Corporation. Process for the production of macrocyclic esters by the depolymerization of polyesters. 4,709,058, Cl. 549-267.000.
Calgon Carbon Corporation: *See*—
Matviya, Thomas M.; Gebhard, Robert S.; and Greenbank, Michael, 4,708,853, Cl. 423-210.000.
Callahan, Michael J.: *See*—
Welland, David R.; and Callahan, Michael J., 4,709,225, Cl. 340-347.0CC.
Cameronics Technology Corporation, Ltd.: *See*—
Raith, Siegfried K., 4,708,467, Cl. 355-53.000.
Campau, Daniel N. System for distributing water flow between a reservoir and a water source. 4,708,084, Cl. 114-255.000.
Canadian Fram Limited: *See*—
Anderson, Andrew G.; and Shoji, Leigh A., 4,708,229, Cl. 192-87.170.
Cook, John E., 4,708,316, Cl. 251-39.000.
Canadian Gas Research Institute: *See*—
Besik, Ferdinand, 4,708,000, Cl. 62-480.000.
Canadian Patents and Development Limited: *See*—
Hodgson, Earl I., 4,708,006, Cl. 70-303.00R.
Canadian Sun Systems Ltd.: *See*—
Dorbeck, Leo R., 4,708,124, Cl. 126-438.000.
Canon Kabushiki Kaisha: *See*—
Arai, Hitoshi, 4,709,147, Cl. 250-234.000.
Asakura, Osamu, 4,708,504, Cl. 400-637.000.
Hanagata, Takayoshi, 4,709,249, Cl. 346-140.00R.
Honda, Haruhisa; and Saito, Takashi, 4,709,273, Cl. 358-256.000.
Hosono, Nagao; Nagase, Yukio; Takeuchi, Tatsuo; Egami, Hidemi; and Satomura, Hiroshi, 4,709,298, Cl. 361-213.000.
Isohata, Junji; Yamamoto, Hironori; and Matsushita, Koichi, 4,708,465, Cl. 355-53.000.
Isohata, Junji; and Miyazaki, Makoto, 4,708,466, Cl. 355-53.000.
Kadokura, Susumu; Sawayama, Ippei; Kato, Tomoaki; and Okamoto, Tadashi, 4,709,221, Cl. 336-200.000.
Kodaira, Takanori; and Egawa, Akira, 4,708,454, Cl. 354-422.000.
Kubota, Atsushi; Taniishi, Shinnosuke; Sasaki, Shinichi; Kimura, Akiyoshi; and Koike, Michiro, 4,708,455, Cl. 355-3.00R.
Odagawa, Kazuyoshi, 4,709,128, Cl. 200-340.000.
Shimura, Shoichi, 4,708,457, Cl. 355-3.0TR.
Suda, Yasuo; Akashi, Akira; and Hiramatsu, Akira, 4,709,138, Cl. 250-201.000.
Takahashi, Kazuyoshi; Suzuki, Koji; Nagahira, Joji; Yoshihara, Kunio; Matsui, Toshiro; and Ishikawa, Tadashi, 4,709,319, Cl. 363-49.000.
Takeuchi, Akihiko, 4,709,250, Cl. 346-160.000.
Tanioka, Hiroshi, 4,709,274, Cl. 358-283.000.
Tsuji, Sadahiko, 4,708,444, Cl. 350-427.000.
Uchikata, Yoshio; Nozaki, Mineo; Nagashima, Masasumi; and Asakura, Osamu, 4,709,242, Cl. 346-76.0PH.

Capizzi, Giuseppe N.; Cianci, Cesario; and Melgara, Marcello, to Centro Studi e Laboratori Telecomunicazioni S.p.A. Digital speech synthesizer. 4,709,340, Cl. 364-513.500.

Carboxyque Francaise: *See*—
Gibot, Claude; and Charles, Jean-Michel, 4,707,951, Cl. 51-410.000.

Cardenas-Franco, Luis; and Taddei-Contreras, Fernando, to Vitro Tec Fideicomiso. Method and apparatus for synchronizing the velocity of a 90 degree push-out apparatus and of the carrier converyor in an I.S. glassware forming machine. 4,708,727, Cl. 65-29.000.

Cardenas-Franco, Luis; and Lopez-Mota, Ricardo, to Vitro Tec Fideicomiso. Electronic system for automatically controlling the weight and the shape of glass gobs in a molten glass feeder. 4,708,729, Cl. 65-164.000.

Carducci, Carlo, to Magneti Marelli S.p.A. Windscreen wiper for motor vehicles. 4,707,876, Cl. 15-250.230.

Caribbean Industrial Research Institute: *See*—
Dinanath, Chandra, 4,708,056, Cl. 99-575.000.

Carl Freudenberg, Firma: *See*—
Busen, Dietmar; Schluter, Helmut; Weghmann, Arnold; Blumler, Norbert; and Teci, Bohuslav, 4,708,756, Cl. 156-143.000.

Carlson, Gary, to Wizards Ice Cream & Confectionery Shoppe, Ltd. Blending machine. 4,708,489, Cl. 366-149.000.

Carlson, Michael G.; Ward, Ronald A.; and Jolin, Terry H., to Western Forms, Inc. Multiple purpose concrete form with side rail stiffeners. 4,708,315, Cl. 249-192.000.

Carpenter-Green, Sharon S.: *See*—
Popescu, Mircea C.; Weiner, Alan L.; and Carpenter-Green, Sharon S., 4,708,861, Cl. 424-1.100.

Carrig, Raymond D., Jr.: *See*—
Bizer, Jerry L.; and Carrig, Raymond D., Jr., 4,707,929, Cl. 33-507.000.

Carroll, Stephen F.: *See*—
Collier, R. John; and Carroll, Stephen F., 4,709,017, Cl. 530-350.000.

Carron, Philippe: *See*—
Balquet, Robert; Baubeau, Robert; Bertrand, Jean-Paul; Guezou, Jean-Pierre; and Carron, Philippe, 4,708,077, Cl. 114-67.00A.

Carssow, John F. Remote control price changing sign. 4,707,938, Cl. 40-471.000.

Carta, John: *See*—
Anderson, Robert D.; Estes, John D.; Carta, John; and Page, Gilbert J., 4,707,953, Cl. 52-63.000.

Carter, Charles G., to Stauffer Chemical Company. 2-(pyrimidinecarbonyl)-1,3-cyclohexanediones and their use as herbicidal agents. 4,708,732, Cl. 71-92.000.

Carter, John W., Jr.: *See*—
Kilmer, Lauren G.; and Carter, John W., Jr., 4,708,213, Cl. 175-78.000.

Carter, Richard G., to English Electric Valve Company Limited. Coupled cavity travelling wave tubes. 4,709,186, Cl. 315-3.500.

Cartier Industrie: *See*—
Schomblond, Jacques, 4,708,614, Cl. 425-120.000.

Casals-Stenzel, Jorge: *See*—
Skuballa, Werner; Raduchel, Bernd; Schwarz, Norbert; Vorbruggen, Helmut; Casals-Stenzel, Jorge; Schillinger, Ekkehard; and Town, Michael H., 4,708,963, Cl. 514-530.000.

Cascade Corporation: *See*—
Farmer, Stanley E.; and Seaberg, Richard D., 4,708,575, Cl. 414-607.000.

Casey, John P., Sr.: *See*—
Braychak, Joseph J.; and Casey, John P., Sr., 4,708,553, Cl. 411-34.000.

Caspers, Barbara E.: *See*—
Atal, Bishnu S.; and Caspers, Barbara E., 4,709,390, Cl. 381-51.000.

Castrol Limited: *See*—
Askew, Herbert F.; and Davies, Paul R., 4,708,810, Cl. 252-50.000.

Catalytica Associates: *See*—
Grate, John H.; and Hamm, David R., 4,709,073, Cl. 560-24.000.

Cathriner, Richard L.; and Roose, Thomas R., to Atlantic Richfield Company. System for separating gas-liquid flowstreams. 4,708,793, Cl. 210-188.000.

Cavaliere, Joseph R.: *See*—
Ashton, Gerard J.; Cavaliere, Joseph R.; and Cheng, Ming T., 4,709,169, Cl. 307-455.000.

CBC Industries, Inc.: *See*—
Heimbigner, Thomas; and Tsui, Gary, 4,708,540, Cl. 408-72.00B.

Celanese Corporation: *See*—
Gupta, Balaram B. G., 4,709,102, Cl. 568-780.000.

Cementa AB: *See*—
Ericsson, Tor S., 4,708,488, Cl. 366-2.000.

Central Plastics Company: *See*—
Inhofe, James A., Jr.; and Evans, Harold J., 4,708,527, Cl. 405-216.000.

Centre de Recherche Industrielle du Quebec: *See*—
Leen, Kee K. L. S.; and Chang, Jin R., 4,708,857, Cl. 423-277.000.

Centre International de Recherches Dermatologiques (C.I.R.D.): *See*—
Shroot, Braham; and Maignan, Jean, 4,708,959, Cl. 514-373.000.

Centro Studi e Laboratori Telecomunicazioni S.p.A.: *See*—
Capizzi, Giuseppe N.; Cianci, Cesario; and Melgara, Marcello, 4,709,340, Cl. 364-513.500.

Cerberus AG: *See*—
Muller, Kurt; Gruber, Peter; and Wuthrich, Alfred, 4,709,152, Cl. 250-342.000.

Chamaret, Solange: *See*—
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435-5.000.

Champagne, Michel R., to Genfoot, Inc. Method of waterproofing an article of footwear and the waterproofed article produced therefrom. 4,707,874, Cl. 12-142.00E.

Champion International Corporation: *See*—
Bray, James W., 4,708,790, Cl. 210-87.000.

Chandra, Suresh: *See*—
Fukuda, Robert C.; and Chandra, Suresh, 4,709,368, Cl. 372-10.000.

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Martin, Pierre, 4,709,053, Cl. 548-561.000.
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Cole, Jack H., to Conoco Inc. Oscillating orbital vibrator. 4,709,362, Cl. 367-189.000.
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Cole, Paul A.: *See*—
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Comparetto, John E. Arcuate bone cutter and wedge guide system. 4,708,133, Cl. 128-92.0VY.
Conboy, Stewart J.; and Kish, Robert J., to D. W. Zimmerman Mfg., Inc. Apparatus for handling objects. 4,708,574, Cl. 414-591.000.
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Schroeppel, Edward A., 4,708,143, Cl. 128-419.0PG.
Cordner, Michael A., to Sundstrand Corporation. Multi-range starter-generator drive. 4,708,030, Cl. 74-686.000.
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Cossuth, Joseph J.: *See*—
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Cotter, Byron R.; Lin, Henry C.; and Pawlak, Joseph A., to Occidental Chemical Corporation. 4,4-dihalohexahydrophthalic anhydrides and 4-fluorotetrahydrophthalic anhydride, and process for their preparation. 4,709,056, Cl. 549-246.000.
Coulter Corporation: *See*—
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Cousin, Jean-Claude; and Robin, Jacques A., to Cousin Freres. Composite cord manufacturing method. 4,707,977, Cl. 57-297.000.

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Cowan, Carl E.; Lubinsky, Anthony R.; Nylund, Thomas W.; Specht, Malcolm R.; and Spence, John P., to Eastman Kodak Company. Electrophotographic color proofing apparatus and method. 4,708,459, Cl. 355-4.000.

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Cox, Delbert L., to NACO Industries, Inc. Plastic Tee fitting. 4,708,374, Cl. 285-156.000.

Crapanzano, Angelo T., to Loral Corporation. Antiskid system monitoring circuit. 4,709,223, Cl. 340-52.00B.

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Crawford, Robert J., to Motorola, Inc. Programmable multifrequency digital tone receiver. 4,709,344, Cl. 364-724.000.

Creech, Clyde W. Beam profile cutting machine and method. 4,707,898, Cl. 29-155.00R.

Cresswell, Thomas A. Disassemblable sulky for attachment to a steerable front wheel assembly condition. 4,708,219, Cl. 180-11.000.

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Croset, Michel R.: *See*—
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Croston, Robert B.: *See*—
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Crucible Chemical Company: *See*—
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Cruz, Graham J. System for raising and lowering portable cargo containers. 4,708,319, Cl. 254-45.000.

Cruz, Richard. Vehicle door protector. 4,708,380, Cl. 293-128.000.

Crystal Semiconductor Corporation: *See*—
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Cudaback, Roger L., to J. A. Baldwin Manufacturing Co. Drain valve. 4,708,171, Cl. 137-588.000.

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Cuno Incorporated: *See*—
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Cusson, Paul R., to N.S.M. Corporation. Satellite dish antenna frame. 4,709,241, Cl. 343-916.000.

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D'Agosta, Nino. Exercise and sporting device. 4,708,340, Cl. 272-117.000.

Dahl, Randy L., to Motorola, Inc. Target detection in aerosols using active optical sensors and method of use thereof. 4,709,142, Cl. 250-221.000.

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Dahlstrom, David K.; Fife, Merrill E.; and Judy, Charles R., to Allied Corporation. Flexural disk transducer. 4,709,361, Cl. 367-165.000.

Dai, Shenghong A., to Dow Chemical Company, The. Polyesteramide from hydroxy phenyl-isopropyl-amino diphenyl ether. 4,709,004, Cl. 528-185.000.

Daicel Chemical Industries Ltd.: *See*—
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Daigle, Rosaire. Stand for holding leaf bags. 4,708,307, Cl. 248-97.000.

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Danfoss A/S: *See*—
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Tietze, Jurgen; Danguillier, Wilhelm; Thubesville, Heinz; Pohl, Siegfried; and Muller, Friedrich, 4,708,196, Cl. 165-47.000.

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Daniell, Michael G.: *See*—
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Daniels, John R., to Target Therapeutics. Hyperthermic treatment of tumors. 4,708,718, Cl. 604-53.000.

Dargo, David R.: *See*—
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Data General Corporation: *See*—
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Davenport, Duke. Trailer hitching apparatus. 4,708,359, Cl. 280-477.000.

Davies, David T. Stock barrier. 4,708,515, Cl. 404-6.000.

Davies, Paul R.: *See*—
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Davin, Donald R.; and Brown, Robert L., to White Consolidated Industries, Inc. Asphalt paving machine with liftable, adjustable auger mechanisms. 4,708,519, Cl. 404-101.000.

Davis, Gary C.: *See*—
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Davis, George H. Collapsible food and beverage container. 4,708,248, Cl. 206-549.000.

Davis, Kirk E., to Lubrizol Corporation, The. Two-cycle engine oils containing alkyl phenols. 4,708,809, Cl. 252-33.400.

Davis, Michael S. Balancing game device and method. 4,708,342, Cl. 273-1.0GF.

Davis, Pauls: *See*—
Panek, Edward J.; and Davis, Pauls, 4,709,099, Cl. 568-624.000.

Davis, William F., to Motorola, Inc. Operational amplifier with passive current limiting. 4,709,216, Cl. 330-252.000.

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Day, Roger A.; Tommis, Norman; and Baker, Andrew R., to AE Plc. Reinforced pistons. 4,708,104, Cl. 123-193.00P.

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Deane, Graham; and Weightman, Barry O., to National Research Development Corporation. Suction-irrigation apparatus. 4,708,717, Cl. 604-35.000.

Dearman, Timothy C. Internal alignment clamp. 4,708,279, Cl. 228-49.300.

Deaton, Thomas M., to Otis Engineering Corporation. Safety valve. 4,708,163, Cl. 137-460.000.

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Deguchi, Takashi: *See*—
Kuriyama, Keiichi; Miura, Kenichiro; and Deguchi, Takashi, 4,709,292, Cl. 361-22.000.

Deguin, Alain, to Societe Amenagement Urbain et Rural S.A. Installation and apparatus for treating a liquid, in particular for demineralizing water passing through a bed of active granular material which is compacted in a high position and which is periodically regenerated by a reverse flow. 4,708,794, Cl. 210-189.000.

Deha Baubedarf GmbH & Co. KG: *See*—
Pape, Harald, 4,708,612, Cl. 425-117.000.

De Haan, Pieter; Lerk, Coenraad F.; and Schoonen, Adelbert J. M., to Rijksuniversiteit Groningen. Devices for the controlled release of active substances, as well as process for the preparation thereof. 4,708,874, Cl. 424-470.000.

Dehlinger, James R.: *See*—
Palentyn, Gunther H.; Dehlinger, James R.; and Rigsby, Donald R., 4,708,390, Cl. 276-188.000.

Delacou, Jean Michel, to Enertec. Apparatus for varying the path of magnetic tape passing over a rotary tape head. 4,709,280, Cl. 360-85.000.

Delafoy, Jean-Alain: *See*—
Buisson, Claude; and Delafoy, Jean-Alain, 4,708,237, Cl. 198-726.000.

Del Bello, Athos; and Kilcher, Beat, to AG fur industrielle Elektronik AGIE Losone b. Locarno. Method for adaptive control of operating

parameters during spark-erosive cutting and spark-erosive cutting plant for the same. 4,709,131, Cl. 219-69.00M.

Delia, Anthony D.: *See*—
Ludwig, Clifford J.; and Delia, Anthony D., 4,707,865, Cl. 4-228.000.

Deline, Douglas N. Protective seal for a can. 4,708,257, Cl. 220-257.000.

Dell'Orto, Renato: *See*—
Robecchi, Edoardo; and Dell'Orto, Renato, 4,708,702, Cl. 474-261.000.

DeLorenzo, Anthony N.: *See*—
Spieth, Robert H.; and DeLorenzo, Anthony N., 4,709,262, Cl. 358-74.000.

Demerson, Christopher A.: *See*—
Mobilio, Dominick; Demerson, Christopher A.; and Humber, Leslie G., 4,709,048, Cl. 548-439.000.

Denk, Joseph, to Garrett Corporation, The. Toothless stator construction for electrical machines. 4,709,180, Cl. 310-179.000.

Denki Kagaku Kogyo Kabushiki Kaisha: *See*—
Sakai, Etsuo; Nishioka, Asaaki; Watansbe, Kiyosi; and Mino, Iwao, 4,708,626, Cl. 425-398.000.

Denny, Ronald R.: *See*—
Claeys, Richard J.; Denny, Ronald R.; Vaughan, Joseph D.; and Eumurian, Charles, 4,708,660, Cl. 439-65.000.

Derderian, Scott K., to General Electric Company. Subslot cover for dynamoelectric machine. 4,709,181, Cl. 310-214.000.

Deringer, Thomas J., to International Business Machines Corporation. Manipulator gripper tool. 4,708,383, Cl. 294-86.400.

Derkacs, Thomas: *See*—
Murphy, Stephan D.; and Derkacs, Thomas, 4,709,156, Cl. 250-560.000.

Derrington, Carl E.: *See*—
Folk, Lee E.; and Derrington, Carl E., 4,708,012, Cl. 73-4.00R.

Dervan, Andrew H.: *See*—
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,708,995, Cl. 525-450.000.

Desfontaines, Guy; and Le Helloco, Michel, to Framatome. Control unit for a nuclear reactor. 4,708,843, Cl. 376-219.000.

Desprez, Marc; and Roux, Michel, to L'Air Liquide. Device to improve the heating of a glass distribution channel and process for operating such device. 4,708,728, Cl. 65-136.000.

des Snead, Edwin. Multi-hull sailboat with fixed airfoils. 4,708,075, Cl. 114-39.100.

Desurvire, Emmanuel; Digonnet, Michel J. F.; and Shaw, H. J., to Leland Stanford Junior University, The Board of Trustees of the. In-line fiber optic memory. 4,708,421, Cl. 350-96.150.

Deutsche ITT Industries GmbH: *See*—
Mehrgardt, Soenke, 4,709,270, Cl. 358-188.000.

Deutsche Texaco Aktiengeselischaft: *See*—
Osterburg, Gunther; Gluzek, Karl-Heinz; and Neier, Wilhelm, 4,709,106, Cl. 568-917.000.

Deux, Alain; Merant, Jean-Camille; Gibert, Francois; and Berger, Antoine, to Braud, Societe Anonyme; and Tecmachine, Societe Anonyme. Method for harvesting fruit, berries and the like, in particular for gathering grapes in whole bunches. 4,707,973, Cl. 56-328.00R.

Devletian, Jack H.: *See*—
Johnsen, John L.; Wood, William E.; Devletian, Jack H.; and Spring, Donald G., 4,708,282, Cl. 228-263.160.

Devries, Louis; and Ryason, P. R., to Chevron Research Company. Conversions of low molecular weight hydrocarbons to higher molecular weight hydrocarbons using a metal compound-containing catalyst. 4,709,108, Cl. 585-415.000.

de Vries, Luitzen; and Wierda, Gerhard J., to Fokker B.V. Simulator of mechanical properties of a steering system. 4,708,656, Cl. 434-45.000.

DewEze Manufacturing, Inc.: *See*—
Forpahl, Raye E.; Hostetler, Dewey L.; and Hostetler, Delmar G., 4,707,971, Cl. 56-6.000.

De Wit, Jan B., to Nederlandse Centrale Organisatie voor Toegepast-Natuurwe-Tenschappelijk Onderzoek. Apparatus for adjusting a central heating installation. 4,708,287, Cl. 237-8.00R.

Diafoil Company, Limited: *See*—
Utsumi, Shigeo; Kanesaki, Tateo; Kagiyama, Takashi; Otonari, Satoshi; Ikushima, Koichiro; and Okumura, Norio, 4,708,902, Cl. 428-141.000.

Diamantoglou, Michael; Magerlein, Helmut; Brodowski, Walter; Grimm, Wolfgang; and Meyer, Gerhard, to Akzona Incorporated. Hydrophilic polyester compounds. 4,708,985, Cl. 525-166.000.

Diehr, Hans-Joachim: *See*—
Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hanssler, Gerd, 4,708,731, Cl. 71-90.000.

Diesel Kiki Co., Ltd.: *See*—
Hiyama, Yasuhiro, 4,707,927, Cl. 33-366.000.
Hiyama, Yasuhiro, 4,708,317, Cl. 251-129.160.
Okamoto, Kenji, 4,709,335, Cl. 364-431.050.

Dietrich, Kurt; Stihler, Axel; and Theilacker, Wolfgang, to Stihler Medizintechnik GmbH. Device to heat infusion and transfusion solutions. 4,709,135, Cl. 219-303.000.

Dietz, Wolfgang F. W., to RCA Corporation. S-capacitance switching circuit for a video display. 4,709,193, Cl. 315-408.000.

Dietze, Herbert: *See*—
Schaeffer, Norbert; Bettinger, Gunter; Goetz, Klaus; Pfefferkorn, Dietmar; Burkle, Ottmar; Schmidts, Kurt; Schneider, Pierre; Wagner, Werner; Wietholter, Dieter; Dietze, Herbert; and Andriessen, Wilhelmus, 4,709,288, Cl. 360-130.210.

Di Giulio, Adolph V.: *See*—
Ingram, Alvin R.; and Di Giulio, Adolph V., 4,708,968, Cl. 521-60.000.

Digonnet, Michel J. F.: *See*—
Desurvire, Emmanuel; Digonnet, Michel J. F.; and Shaw, H. J., 4,708,421, Cl. 350-96.150.

Dillard, John A., III, to PJD Associates Inc. Water quality monitor. 4,708,791, Cl. 210-96.200.

Dinanath, Chandra, to Caribbean Industrial Research Institute. Coconut dehusking machine. 4,708,056, Cl. 99-575.000.

Dirks, Albertus G.; and Brongersma, Hidde H., to U.S. Philips Corporation. Optically readable information disc having a reflection layer formed form a metal alloy. 4,709,363, Cl. 369-275.000.

Dirlikov, Stoil K.; and Schneider, Connie J., to Dow Chemical Company, The. Process for selective halogenation of primary hydroxyl groups. 4,709,059, Cl. 549-453.000.

DiRocco, Jobbie. Heat pad. 4,708,608, Cl. 425-14.000.

Disko, Harry: *See*—
Kulesza, Ralph J.; Wozniak, Walter J.; and Disko, Harry, 4,708,690, Cl. 446-351.000.

Dispenziere, Nicholas C., Jr.: *See*—
Murrell, Lawrence L.; and Dispenziere, Nicholas C., Jr., 4,708,945, Cl. 502-263.000.

D'Muhala, Thomas F. Barium sulfate removal and anti-deposition compositions and process of use therefor. 4,708,805, Cl. 210-698.000.

Dr. Ing. h.c.F. Porsche Aktiengesellschaft: *See*—
Gaigl, Dietmar; and Amann, Klaus, 4,709,134, Cl. 219-201.000.

Dr.-Ing. Rudolf Hell GmbH: *See*—
Fischer, Gerhard; and Scheuter, Karl R., 4,709,395, Cl. 382-54.000.

Dr. Johannes Heidenhain GmbH: *See*—
Kraus, Heinz, 4,708,437, Cl. 350-162.230.

Dr. Karl Thomae GmbH: *See*—
Bricki, Rolf; Schepky, Gottfried; Rupprecht, Eckhard; and Greischel, Andreas, 4,708,868, Cl. 924-80.000.

Doderer, Gerhard; Kiefer, Heinz; and Krieger, Willi, to Robert Bosch GmbH. Apparatus for shaping wrappers for packages. 4,708,706, Cl. 493-295.000.

Doery, Michael S.: *See*—
Bober, Henry T.; and Doery, Michael S., 4,708,469, Cl. 355-77.000.

Doetsch, Paul: *See*—
Suhadolnik, Robert J.; Wu, Joseph M.; Doetsch, Paul; and Henderson, Earl E., 4,708,935, Cl. 435-91.000.

Dohr, Manfred; Wiemers, Norbert; and Gruber, Werner, to Henkel Kommanditgesellschaft auf Aktien. Thermoplastic polyamide as fragrance carrier. 4,708,973, Cl. 523-102.000.

Dolfini, Joseph E.; and Glinka, Jerome, to Mallinckrodt, Inc. Hydrolysis of activated olefinic ketones and aldehydes. 4,709,098, Cl. 568-491.000.

Donaldson, Michael J.; Pue-Gilchrist, James D.; and Scott, James R., to Northern Telecom Limited. Cabinet for optical cable terminating equipment. 4,708,430, Cl. 350-96.200.

Donegan, Thomas E.; and Leary, Timothy G., to BASF Corporation. Copper phthalocyanine pigments. 4,709,021, Cl. 540-141.000.

Donomoto, Tadashi; Tatematsu, Yoshiaki; Tanaka, Atsuo; and Kubo, Masahiro, to Toyota Jidosha Kabushiki Kaisha. Method for alloying substances. 4,708,847, Cl. 420-129.000.

Donovan, Dennis; McDonnell, Michael L.; Weigel, Gerald C.; and Long, John E., to Archer Daniels Midland Company. Animal feed blocks containing dietary supplements. 4,708,877, Cl. 426-69.000.

Donovan, Joseph F.: *See*—
Salerni, John V.; and Donovan, Joseph F., 4,708,200, Cl. 166-55.100.

Dorbeck, Leo R., to Canadian Sun Systems Ltd. Control of hydrogen permeation especially in solar collectors. 4,708,124, Cl. 126-438.000.

Dore, James E.: *See*—
Brockmeyer, Jerry W.; Aubrey, Leonard S.; Dore, James E.; and Soble, Clifford N., 4,708,326, Cl. 266-159.000.

Dorler, Jack A.: *See*—
Banker, Dennis C.; Dorler, Jack A.; and Hryckowian, John N., 4,709,166, Cl. 307-441.000.

Dornier GmbH: *See*—
Metzdorff, Walter; Lux, Peter; and Eibert, Max, 4,708,473, Cl. 356-5.000.
Zankl, Wolfgang, 4,708,778, Cl. 204-25.000.

Dornier System GmbH: *See*—
Scherber, Werner; and Schroeder, Hans W., 4,708,419, Cl. 350-1.100.

Doty, Gerald A., to Gateway Industries, Inc. Seat belt retraction apparatus including an inertia sensor. 4,708,364, Cl. 280-806.000.

Doty, Gerald A., to Gateway Industries, Inc. Seat belt retraction apparatus with remote inertia sensor. 4,708,366, Cl. 280-803.000.

Douchy, Michel, to Vallourec. Composite product having a tubular metal casing with a welt-type seam, and a core in powder form, which can be rolled up. 4,708,897, Cl. 428-36.000.

Dougherty, Joseph P.: *See*—
AbuJudom, David N., II; Dougherty, Joseph P.; and Stengel, Kevin M., 4,708,600, Cl. 417-322.000.

Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V.: *See*—
le Granse, Josephus N., 4,708,263, Cl. 222-1.000.

Dow Chemical Company, The: *See*—
Bethea, James R.; and Knight, Clifton T., 4,708,615, Cl. 425-131.100.
Chou, Richard T., 4,709,039, Cl. 548-237.000.
Dai, Shenghong A., 4,709,004, Cl. 528-185.000.
Dirlikov, Stoil K.; and Schneider, Connie J., 4,709,059, Cl. 549-453.000.
Grinstead, Robert R., 4,708,854, Cl. 423-235.000.
Harris, Robert F., 4,709,069, Cl. 558-265.000.
Hoffman, Dwight K.; and Arends, Charles B., 4,708,996, Cl. 525-530.000.

Jung, Chu W.; Garrou, Philip E.; and Strickler, Gary R., 4,709,115, Cl. 585-643.000.
Kirkpatrick, Charles C., 4,708,858, Cl. 423-300.000.
Skach, Edward J., Jr.; Brake, David W.; and Waibel, Joseph H., 4,708,737, Cl. 75-58.000.
Stanley, Frederick W., Jr.; Lamphere, Jack C.; and Chonde, Yohannes, 4,708,997, Cl. 526-207.000.

Dow Corning Corporation: *See—*
Kemerer, Beverly K., 4,708,807, Cl. 252-8.600.
Maxson, Myron T., 4,709,001, Cl. 528-15.000.

Doyle, Michael P.; Forte, Francis J.; and Galkowski, Edward, to Stewart-Warner Corporation. Swivel caster assembly and method of making. 4,707,880, Cl. 16-38.000.

Drackett Company, The: *See—*
Ludwig, Clifford J.; and Delia, Anthony D., 4,707,865, Cl. 4-228.000.

Draftex Industries Limited: *See—*
Gommier, Herve ; and Lamblin, Jean-Michel, 4,708,898, Cl. 428-36.000.

DRAGOCO Gerberding & Co. GmbH: *See—*
Brunke, Ernst-Joachim; and Struwe, Hartmut, 4,709,061, Cl. 549-544.000.

Dreibelbis, Jeffrey H.: *See—*
Braceras, George M.; and Dreibelbis, Jeffrey H., 4,709,162, Cl. 307-270.000.

Dresser Industries, Inc.: *See—*
Scallan, David J., 4,708,164, Cl. 137-476.000.

Droscher, Michael: *See—*
Gerth, Christian; and Droscher, Michael, 4,708,986, Cl. 525-177.000.

Drug Delivery Systems Inc.: *See—*
Sibalis, Dan, 4,708,716, Cl. 604-20.000.

Dudnick, Steven L. Creative art medium for forming artistic expressions having a latent luminescent image pattern. 4,708,817, Cl. 252-301.160.

Dunbar, William H., IV. Arthroscopic drill guide. 4,708,139, Cl. 128-305.100.

Duncan, Richard L.: *See—*
Forehand, Gilbert H.; Lynch, Michael J.; Duncan, Richard L.; Tilghman, Stephen E.; and Penn, Jack C., 4,709,234, Cl. 340-856.000.

Dunham, William D.; Flaig, John D.; Petersen, H. Norman; and Young, Robert F., to Outboard Marine Corporation. Outboard motor cowl assembly. 4,708,673, Cl. 440-77.000.

Dunn, George F., Jr., to Du Pont de Nemours, E. I., and Company. Particle separation process. 4,708,710, Cl. 494-37.000.

Dunn, John P.; Collins, Kent L.; and King, Norman R., to North American Philips Lighting Corp. Method of making support means for discharge lamp tubes. 4,708,679, Cl. 445-26.000.

Dupler, Tim: *See—*
Purvis, Gene; Phelps, Russell; and Dupler, Tim, 4,708,088, Cl. 118-300.000.

Du Pont de Nemours, E. I., and Company: *See—*
Awano, Yoshiyuki, 4,708,416, Cl. 439-851.000.
Bockrath, Richard E.; and Kirksey, Kirby, 4,708,806, Cl. 210-754.000.
Dunn, George F., Jr., 4,708,710, Cl. 494-37.000.
Garrison, William E., Jr., 4,708,980, Cl. 524-412.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,708,995, Cl. 525-450.000.
Mai, Khuong H. X.; and Patil, Ghanshyam, 4,709,042, Cl. 548-312.000.
Nugent, William A.; and Waller, Francis J., 4,709,085, Cl. 560-124.000.
Pardini, Steven P., 4,708,870, Cl. 424-81.000.
Shain, Albert L., 4,708,975, Cl. 523-216.000.
Sowell, Lyles H., 4,707,896, Cl. 28-250.000.
Tabb, David L., 4,708,988, Cl. 525-194.000.

Durant, Jacques; Simon, Georges; and Charton, Alain, to Etat Francais. Automatic fire arm with external motor. 4,708,049, Cl. 89-11.000.

Durrant, James A.: *See—*
Bews, Brian; Critchley, Peter; Durrant, James A.; Stebles, Malcolm R. D.; and Tipping, Leigh R. H., 4,708,863, Cl. 424-47.000.

Dursch, Walter: *See—*
Schlingmann, Merten; Hoppe, Hans-Ullrich; and Dursch, Walter, 4,709,086, Cl. 560-171.000.

Dutescu, Cornel J. Gaseous fuel reactor. 4,708,637, Cl. 431-116.000.

Dutka, Ferenc: *See—*
Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Nagy, Mihaly; and Bacskai, Gyorgy, 4,708,733, Cl. 71-94.000.

Duval, David R. Single line pair power control system with multi-station capability. 4,709,233, Cl. 340-825.180.

Dye, Malcolm S.; and Barlow, Arthur J., to British Aerospace PLC. Fibre optic gyroscope with temperature compensation. 4,708,479, Cl. 356-350.000.

Dynamic Air Inc.: *See—*
Steele, James R., 4,708,535, Cl. 406-93.000.

Dynamit Nobel AG: *See—*
Schmidt, Werner, 4,708,743, Cl. 106-12.000.

Dziedzic, Edward: *See—*
Hoyt, Robert M.; Dziedzic, Edward; and Rinehart, William M., 4,707,964, Cl. 52-742.000.

E.C.H. Will (GmbH & Co.): *See—*
Besemann, Alfred, 4,708,332, Cl. 270-39.000.

E. R. Squibb & Sons, Inc.: *See—*
Krapcho, John, 4,709,046, Cl. 548-409.000.

Eash, Lester E. Stopper remover. 4,708,033, Cl. 81-3.370.

Eastman Kodak Company: *See—*
Cowan, Carl E.; Lubinsky, Anthony R.; Nylund, Thomas W.; Specht, Malcolm R.; and Spence, John P., 4,708,459, Cl. 355-4.000.
Myers, Drewfus Y., Jr.; Alexandrovich, Peter S.; Pearce, Glenn T.; Santilli, Domenic; Sreekumar, Chandrasekha; Berwick, Martin A.; Upson, Donald A.; and Goebel, William K., 4,708,923, Cl. 430-112.000.
Piatt, Michael J.; Theodoras, James T., II; and Ray, Randy, 4,709,244, Cl. 346-140.00R.
Piatt, Michael J., 4,709,245, Cl. 346-140.00R.
Piatt, Michael J.; and Houser, Kevin L., 4,709,246, Cl. 346-140.00R.
Piatt, Michael J.; and Houser, Kevin L., 4,709,247, Cl. 346-140.00R.
Piatt, Michael J.; and Ray, Randy, 4,709,248, Cl. 346-140.00R.
Roth, Joseph A.; and Smith, Thomas A., 4,708,776, Cl. 204-1.00T.

Eastman, Peter M. Bulk cartridge magazine for firearms and process for loading. 4,707,941, Cl. 42-50.000.

Eckart, George R., to Woodhead Industries, Inc. Rotatable electrical elbow fitting. 4,708,663, Cl. 439-469.000.

Eckler, Paul E., to International Minerals & Chemical Corp. Crystallization-inhibited trimethylolethane solutions. 4,709,104, Cl. 568-853.000.

Ecklund, Richard C.: *See—*
Yasui, Ken K.; Williams, Neil R.; Ecklund, Richard C.; Hayase, Masashi; and Walkington, Robert J., 4,708,008, Cl. 72-60.000.

Edgerton, Willie H., to Ouzts, Wilbert. Valve seat cutting tool. 4,708,541, Cl. 408-83.500.

Edminster, Robert E., to Motorola, Inc. Axial movement blocking apparatus. 4,708,511, Cl. 403-316.000.

Edwards, Gene R.; and Anderson, Charles W. Ouch saver circuit tester guide and methods of constructing and utilizing same. 4,709,206, Cl. 324-158.00P.

Edwards, Robert J. Nonslip crutch foot assembly. 4,708,154, Cl. 135-84.000.

Egami, Hidemi: *See—*
Hosono, Nagao; Nagase, Yukio; Takeuchi, Tatsuo; Egami, Hidemi; and Satomura, Hiroshi, 4,709,298, Cl. 361-213.000.

Egawa, Akira: *See—*
Kodaira, Takanori; and Egawa, Akira, 4,708,454, Cl. 354-422.000.

Eggert, Horst; and Olsen, Willi, to Siemens Aktiengeselischaft. Protective device for preventing blowout of bushing in high-voltage switching installation. 4,709,291, Cl. 361-2.000.

Egon, Janosdeak; Tibor, Gergely; and Janos, Szabo , to Autoipari Kutato es Fejleszto Vallalat. Brake lining, particularly for a vehicle drum brake. 4,708,226, Cl. 188-251.00A.

Ehl, James H., to United States of America, National Aeronautics and Space Administration. Alignment and assembly tool for very large diameter cylinders. 4,708,330, Cl. 269-43.000.

Ehrl, Winfried: *See—*
Bathelt, Heinrich; Ehrl, Winfried; Wehowsky, Frank; Kleber, Rolf; Lotz, Werner; Glenz, Wolfgang; Herdt, Hubert; Jackel, Lothar; Mast, Jan-Hilbert; Hintermeier, Karl; and Muller, Manfred, 4,709,074, Cl. 560-33.000.

Ehrler, Arthur J., to General Signal Corporation. Solvent absorption and recovery system. 4,708,721, Cl. 55-40.000.

Eibert, Max: *See—*
Metzdorff, Walter; Lux, Peter; and Eibert, Max, 4,708,473, Cl. 356-5.000.

Eichen, Erwin; and Flasck, James, to Ovonic Synthetic Materials Company. Dental drill bit having disordered, wear resirtant boron carbon external coating. 4,708,653, Cl. 433-165.000.

Eichenwald, Rolf: *See—*
Wang, Xian T.; and Eichenwald, Rolf, 4,709,199, Cl. 318-696.000.

Eidelberg, Boaz: *See—*
Servi, Rami; Eidelberg, Boaz; Granot, Daniel; Armoza, Ehud; and Sher, Ephraim, 4,708,333, Cl. 270-45.000.

Eifert, Gyula: *See—*
Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Nagy, Mihaly; and Bacskai, Gyorgy, 4,708,733, Cl. 71-94.000.

Eigenmann, Ludwig. Method of adhering a prefabricated marking strip to a roadway surface without having to treat the roadway surface and self-adhesive sealing strip itself. 4,708,518, Cl. 404-79.000.

Eisai Co., Ltd.: *See—*
Yamatsu, Isao; Abe, Shinya; Inai, Yuichi; Suzuki, Takeshi; Kinoshita, Kensaku; Mishima, Mannen; Katoh, Yoshinori; Kobayashi, Seiichi; Murakami, Manabu; and Yamada, Kouzi, 4,709,079, Cl. 560-66.000.

Eisenberg, Roselyn J.: *See—*
Cohen, Gary H.; and Eisenberg, Roselyn J., 4,709,011, Cl. 530-324.000.

Eishin Technology Company, Ltd.: *See—*
Kubo, Chikanari, 4,708,603, Cl. 417-415.000.

Ejiri, Yoshihiro; Nagai, Akira; Nakai, Taiichiro; and Niiro, Yasuhiko, to Kokusai Denshin Denwa Kabushiki Kaisha. Optical submarine cable connection. 4,708,427, Cl. 350-96.200.

Ekker, Frank A. Crankless reciprocating internal combustion engine. 4,708,099, Cl. 123-54.00A.

Elektromanufaktur Zangenstein Hanauer GmbH & Co.: *See—*
Giesl, Johann, 4,709,164, Cl. 307-326.000.

Elka, Shmuel; and Satran, Amir, to Iscar Ltd. Metal cutting tool. 4,708,537, Cl. 407-46.000.

Elliehausen, Heinrich: *See*—
Grenacher, Armin V.; Strohmeyer, Max; Hoffmann, Herwig; and Elliehausen, Heinrich, 4,709,105, Cl. 568-883.000.
Elpatronic AG: *See*—
Tengler, Hermann; and Mettler, Paul, 4,709,132, Cl. 219-110.000.
Elsworth, Adrian J.; Daniell, Michael G.; Zwaan, Paul; and Stewart, David P. M., to Fisher & Paykel Limited. Methods of and/or apparatus for humidifying gases. 4,708,831, Cl. 261-130.000.
Elsworth, John K.; Nownahal, Ali; and Wilson, Kevin, to Pratt & Whitney Canada Inc. Coupling for a fuel manifold. 4,708,371, Cl. 285-13.000.
ELTECH Systems Corporation: *See*—
Mitchell, Thomas A.; Bennett, John E.; Brown, Claude M.; and Pohto, Gerald R., 4,708,888, Cl. 427-126.100.
Ely, Gary W.: *See*—
Browning, Robert A., Jr.; Ely, Gary W.; and Hayes, Leonard L., 4,708,180, Cl. 144-213.000.
Emanuelli, Dino J., to Greenfield Industries, Inc. Threading tap. 4,708,542, Cl. 408-144.000.
Emi, Makoto: *See*—
Ichikawa, Toshiji; Takahara, Kazuaki; Shimoda, Kazuhiro; Seita, Yukio; and Emi, Makoto, 4,708,800, Cl. 210-500.230.
Emond, George T.: *See*—
Ostreicher, Eugene A.; Knight, Rodney A.; Fiore, Joseph V.; Emond, George T.; and Hou, Kenneth C., 4,708,803, Cl. 210-650.000.
Empl, Bernhard: *See*—
Rauscher, Elli; Schaich, Eugen; Neumann, Ulrich; Wahlefeld, August; Gruber, Wolfgang; and Empl, Bernhard, 4,709,020, Cl. 536-17.800.
Emslander, Jeffrey O.; and Larson, Curtis L., to Minnesota Mining and Manufacturing Company. Two part tape tab for opening a container. 4,708,249, Cl. 206-630.000.
Emura, Masaharu; Uetsuki, Haruo; Aoki, Atsuhiro; and Kobayashi, Takehiro, to Ryobi Limited. Drag control mechanism for use in fishing reels. 4,708,303, Cl. 242-218.000.
Enami, Katsuya; Kawamura, Sinobu; Nagase, Fumio; and Aikawa, Shinichi, to Teac Corporation. Head assemblies mounted for optimum contact with a flexible magnetic disk. 4,709,285, Cl. 360-104.000.
Endo, Akira: *See*—
Sasayama, Takao; Oho, Shigeru; Kanke, Atsushi; Shibata, Takanori; and Endo, Akira, 4,708,480, Cl. 356-350.000.
Endo, Juro; Murakami, Shiro; Takada, Yukiharu; and Koike, Yoshiharu, to Hitachi Metals, Ltd. Magnetic recording device having a stabilized zirconia slider and a cobalt based recording medium. 4,709,284, Cl. 360-103.000.
Endom, Edward F. Method and apparatus for conditioning the floor of a poultry rearing area. 4,708,294, Cl. 241-27.000.
Endress u. Hauser GmbH u. Co.: *See*—
Braun, Hans; and Schneider, Georg, 4,708,021, Cl. 73-861.060.
Enel-Ente Nazionale per l'Energia Elettrica: *See*—
Graziadio, Mario; and Ligasacchi, Sergio, 4,708,293, Cl. 239-427.000.
Enertec: *See*—
Delacou, Jean Michel, 4,709,280, Cl. 360-85.000.
Engineered Specialty Products: *See*—
Timmons, John W.; and Timmons, Gloria A., 4,708,446, Cl. 351-158.000.
Englehart, Clem C. Door frame pattern device. 4,707,925, Cl. 33-194.000.
English Electric Valve Company Limited: *See*—
Carter, Richard G., 4,709,186, Cl. 315-3.500.
Engstrom, Folke, to A. Ahlstrom Corporation. Circulating fluidized bed boiler. 4,708,092, Cl. 122-4.00D.
Enomoto, Osaomi; and Komatsuzaki, Katsuo, to Texas Instruments. Semiconductor device fabrication process. 4,708,768, Cl. 437-228.000.
Ensci, Inc.: *See*—
Fitzgerald, Maurice E.; Braunstein, David M.; Alkaitis, Saulius A.; and Pinsky, Naum, 4,708,918, Cl. 429-210.000.
Eppler, Susan G.: *See*—
McAuley, James A.; and Eppler, Susan G., 4,708,212, Cl. 175-42.000.
Erhardt, Paul W.; Hagedorn, Alfred A., III; Lumma, William C., Jr.; and Wohl, Ronald A., to Schering A.G. Process for the preparation of imidazolonecarbonylarylimidazoles. 4,709,043, Cl. 548-318.000.
Erickson, Robert A., to Kennametal Inc.; and Krupp Widia GmbH. Lock rod and apparatus for holding a toolholder. 4,708,040, Cl. 82-36.00B.
Ericsson, Tor S., to Cementa AB. Mixer for water and waste material. 4,708,488, Cl. 366-2.000.
Erlecke, Jens: *See*—
Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; Gasteier, Rolf; and Erlecke, Jens, 4,709,197, Cl. 318-480.000.
Erman, Marko; Theeten, Jean-Bernard; and Vodjdani, Nakita, to U.S. Philips Corp. Optical wave guides and coupling member monolithically integrated on a semiconductor substrate. 4,708,423, Cl. 350-96.150.
Erweka Apparatebau GmbH: *See*—
Schneider, Ortwin; and Georgitsis, Nikolaos, 4,708,023, Cl. 73-863.310.
ESGE-Marby GmbH & Co. KG: *See*—
Belka, Heinrich, 4,708,665, Cl. 439-551.000.
Esser, Gerhard. Riser for drawing off liquids. 4,708,176, Cl. 141-65.000.
Essin, Pierre B.: *See*—
Labaune, Jean-Pierre; and Essin, Pierre B., 4,709,051, Cl. 548-533.000.
Estes, John D.: *See*—
Anderson, Robert D.; Estes, John D.; Carta, John; and Page, Gilbert J., 4,707,953, Cl. 52-63.000.
ETA SA Fabriques d'Ebauches: *See*—
Mock, Elmar; and Hotz, Jean-Marie, 4,708,492, Cl. 368-282.000.
Etablissement Public de Diffusion dit Telediffusion de France: *See*—
Leger, Alain A., 4,709,232, Cl. 340-731.000.
Etablissements Vullierme S.A.: *See*—
Vullierme, Paul, 4,708,352, Cl. 280-11.260.
Etat Francais: *See*—
Durant, Jacques; Simon, Georges; and Charton, Alain, 4,708,049, Cl. 89-11.000.
Etcheparre, Bernard: *See*—
Etcheparre, Jean; and Etcheparre, Bernard, 4,708,331, Cl. 270-31.000.
Etcheparre, Jean; and Etcheparre, Bernard, to Societe Anonyme: Letra Systemes. Device for layer-stacking web-like materials. 4,708,331, Cl. 270-31.000.
Ets. A. Bourbon et Fils: *See*—
Bourbon, Jean, 4,708,239, Cl. 206-45.130.
Eue, Ludwig: *See*—
Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hanssler, Gerd, 4,708,731, Cl. 71-90.000.
Eumurian, Charles: *See*—
Claeys, Richard J.; Denny, Ronald R.; Vaughan, Joseph D.; and Eumurian, Charles, 4,708,660, Cl. 439-65.000.
Evans, Harold J.: *See*—
Inhofe, James A., Jr.; and Evans, Harold J., 4,708,527, Cl. 405-216.000.
Evequoz, Jean-Yves. Ski-sledge. 4,708,353, Cl. 280-16.000.
Everett, Geoffrey J.; and Hunt, Christopher J., to FKI Crypton Limited. Engine analysers. 4,708,121, Cl. 123-643.000.
Everhard, Paul R.; and Monroe, Roy K. Method and tool for inserting a clip. 4,707,908, Cl. 29-526.00R.
Ex-Cell-O Corporation: *See*—
Murphy, Stephan D.; and Derkacs, Thomas, 4,709,156, Cl. 250-560.000.
Exxon Nuclear Company, Inc.: *See*—
Patterson, John F.; MacDuff, Robert B.; and Yates, Jack, 4,708,846, Cl. 376-444.000.
Exxon Research and Engineering Company: *See*—
Murrell, Lawrence L.; and Dispenziere, Nicholas C., Jr., 4,708,945, Cl. 502-263.000.
Schulz, Donald N.; and Kaladas, Jeffrey J., 4,708,998, Cl. 526-287.000.
F. M. Locotos Co., Inc.: *See*—
Locotos, Frank M., 4,708,559, Cl. 411-545.000.
F.M. Valve Manufacturing Co., Ltd.: *See*—
Kawabe, Ryoichi; Iwasaki, Tetsuo; Kozuru, Hiroshi; Yoda, Masashi; Matsunaga, Masakazu; Takamori, Takesi; and Nakasima, Matao, 4,707,867, Cl. 4-313.000.
Faber, Pieter. Concrete foundation pile and device for driving the same into the ground. 4,708,530, Cl. 405-252.000.
Fallis, Mary A.; Urso, Joseph F.; and Urso, Samuel J. Pocket seat cushion. 4,708,393, Cl. 297-452.000.
Falz, Ulrich: *See*—
Walter, Jurgen; Falz, Ulrich; and Lunke, Manfred, 4,708,514, Cl. 403-372.000.
Famag Fahrzeug- und Maschinenhandelsgesellschaft m.b.H. Nfg. KG.: *See*—
Wachter, Johann, 4,707,875, Cl. 15-179.000.
Farmer, Stanley E.; and Seaberg, Richard D., to Cascade Corporation. Forklift truck push-pull slipsheet handler for facilitating conversion of truck between slipsheet handling and pallet handling capabilities. 4,708,575, Cl. 414-607.000.
Farrand Optical Co., Inc.: *See*—
LaRussa, Joseph A.; and Shenker, Martin, 4,708,438, Cl. 350-174.000.
Farrell, John P., to Westvaco Corporation. Trim receiver. 4,708,275, Cl. 226-97.000.
Farrow, Cecil W., to American Telephone and Telegraph Company; and AT&T Information Systems Inc. Technique for decision-directed equalizer train/retrain. 4,709,374, Cl. 375-13.000.
Faulstich, Ingo; and Ulbrich, Dieter, to Hermann Pfauter GmbH & Co. Machine tool controller. 4,708,544, Cl. 409-12.000.
Faure, Alain: *See*—
Grangette, Henri; Llinares, Michel; Bossand, Bernard; and Faure, Alain, 4,708,720, Cl. 44-51.000.
Fauser, Fritz: *See*—
Meyer, Burton C.; and Fauser, Fritz, 4,707,921, Cl. 30-296.00R.
Faust, Uwe: *See*—
Hagelauer, Ulrich; and Faust, Uwe, 4,708,878, Cl. 426-231.000.
Federal Paper Board Co., Inc.: *See*—
Sutherland, Robert L.; and Brown, William M., 4,708,284, Cl. 229-48.00R.
Feinstein, Jonathan J.: *See*—
Masterson, Ian F.; Feinstein, Jonathan J.; and Stambaugh, Lanier, 4,708,738, Cl. 75-59.100.
Feinwerktechnik Schleicher & Co.: *See*—
Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; Gasteier, Rolf; and Erlecke, Jens, 4,709,197, Cl. 318-480.000.
Fekete, Amnon V., to Intevep, S.A. Plunger with simple retention valve. 4,708,597, Cl. 417-259.000.

Feldman, Joachim; and Schult, Manfred, to WABCO Westinghouse Fahrzeugbremsen GmbH. Overload protection and/or warning arrangement. 4,708,225, Cl. 188-1.110.

Felice, Christopher G.: *See*—
Janashak, Robert J.; Felice, Christopher G.; and Akeel, Hadi A., 4,708,175, Cl. 141-1.000.

Ferentchak, Rudolph; Kozischek, James F.; and Schwartz, Jerome E., to Reheis Chemical Company, Inc. Thermosetting resin binder particles and methods for making waferboard. 4,708,967, Cl. 521-56.000.

Fernandes, Roosevelt A. Electrical power line and substation monitoring apparatus and systems. 4,709,338, Cl. 364-483.000.

Fernandes, Roosevelt A. Electrical power line parameter measurement apparatus and systems, including compact, line-mounted modules. 4,709,339, Cl. 364-492.000.

Feynman, Carl R.: *See*—
Hillis, W. Daniel; Knight, Thomas F., Jr.; Bawden, Alan; Kahle, Brewster L.; Chapman, David; Christman, David P.; Lasser, Cliff A.; and Feynman, Carl R., 4,709,327, Cl. 364-200.000.

Field, Thomas T.; Murrin, Thomas A.; and Ault, Earle A., to United Technologies Corporation. Thermal treatment of wrought, nickel base superalloys in conjunction with high energy hole drilling. 4,708,750, Cl. 148-11.50N.

Fife, Merrill E.: *See*—
Dahlstrom, David K.; Fife, Merrill E.; and Judy, Charles R., 4,709,361, Cl. 367-165.000.

Figueroa, Jose L. Combination table cover and skirt retainer. 4,708,183, Cl. 150-52.00R.

Filardo, Giuseppe: *See*—
Silvestri, Giuseppe; Gambino, Salvatore; and Filardo, Giuseppe, 4,708,780, Cl. 204-59.00R.

Fini Elettrocostruzioni Meccaniche, S.p.A.: *See*—
Zambelli, Paolo, 4,708,606, Cl. 417-559.000.

Fiordaliso, Carlo: *See*—
Macchiarulo, Vincenzo; and Fiordaliso, Carlo, 4,708,703, Cl. 474-268.000.

Fiore, Joseph V.: *See*—
Ostreicher, Eugene A.; Knight, Rodney A.; Fiore, Joseph V.; Emond, George T.; and Hou, Kenneth C., 4,708,803, Cl. 210-650.000.

Fiori, David, Jr. Digital-to-analog converter. 4,709,224, Cl. 340-347.0DA.

Firestone Tire & Rubber Company, The: *See*—
Hergenrother, William L.; and Greenstreet, Arthur W., 4,708,987, Cl. 525-184.000.

Firey, Joseph C. Multiple reactor cyclic velox boiler plant. 4,707,991, Cl. 60-670.000.

Fischer, Gerhard; and Scheuter, Karl R., to Dr.-Ing. Rudolf Hell GmbH. Method and apparatus for minimizing errors in the digital processing of electrical signals. 4,709,395, Cl. 382-54.000.

Fischer, Martin: *See*—
Sperling, Karin; and Fischer, Martin, 4,709,109, Cl. 585-438.000.

Fischer, Rolf: *See*—
Hoelderich, Wolfgang; Merger, Franz; and Fischer, Rolf, 4,709,097, Cl. 568-443.000.

Fish, Gerald N.; and Cosuth, Joseph J. Fishing line spool holder for a tackle box. 4,708,244, Cl. 206-315.110.

Fisher, Kenneth J.: *See*—
Mielnik, Thaddeus J., Jr.; Fisher, Kenneth J.; and Aggarwal, Mahesh C., 4,708,849, Cl. 422-26.000.

Fisher & Paykel Limited: *See*—
Elsworth, Adrian J.; Daniell, Michael G.; Zwaan, Paul; and Stewart, David P. M., 4,708,831, Cl. 261-130.000.

Fisher, Robert L., Jr., to AMP Incorporated. Triaxial to coaxial connector assembly. 4,708,666, Cl. 439-580.000.

Fisher Scientific Company: *See*—
Nelson, Larry A., 4,708,886, Cl. 422-72.000.

Fitzgerald, Maurice E.; Braunstein, David M.; Alkaitis, Saulius A.; and Pinsky, Naum, to Ensci, Inc. Battery element and battery incorporating polar polymer system. 4,708,918, Cl. 429-210.000.

FKI Crypton Limited: *See*—
Everett, Geoffrey J.; and Hunt, Christopher J., 4,708,121, Cl. 123-643.000.

Flachglass Aktiengesellschaft: *See*—
Armbruster, Gunter, 4,707,958, Cl. 52-208.000.

Flaig, John D.: *See*—
Dunham, William D.; Flaig, John D.; Petersen, H. Norman; and Young, Robert F., 4,708,673, Cl. 440-77.000.

Flasck, James: *See*—
Eichen, Erwin; and Flasck, James, 4,708,653, Cl. 433-165.000.

Flavell, John; Nash, Michael A.; and Tubb, Anthony B., to Courtaulds Clothing Limited. Laying-up workpieces of flexible sheet material. 4,708,334, Cl. 271-182.000.

Flexible Steel Lacing Company: *See*—
Musil, Edward C., 4,708,558, Cl. 411-457.000.

Flowtron Industries, Inc.: *See*—
Sabatino, Daniel, 4,708,157, Cl. 137-179.000.

Flutti, Fulvio; and Ghezzi, Franco, to Boston S.p.A. Writable adhesive tape. 4,708,907, Cl. 428-352.000.

FMC Corporation: *See*—
Sieburth, Scott M., 4,709,068, Cl. 556-447.000.

Focke & Co. (GmbH & Co.): *See*—
Focke, Heinz; and Mutschall, Hugo, 4,708,704, Cl. 493-151.000.

Focke, Heinz; and Mutschall, Hugo, to Focke & Co. (GmbH & Co.). Process for producing packs with rounded or bevelled edges. 4,708,704, Cl. 493-151.000.

Fokker B.V.: *See*—
de Vries, Luitzen; and Wierda, Gerhard J., 4,708,656, Cl. 434-45.000.

Folgero , Kare: *See*—
Anttila, Einar; and Folgero , Kare, 4,708,192, Cl. 164-323.000.

Folk, Lee E.; and Derrington, Carl E., to Motorola, Inc. Method and apparatus for high pressure testing of solid state pressure sensors. 4,708,012, Cl. 73-4.00R.

Ford, George W., Jr., to Ballard Medical Products. Foamer and method. 4,708,262, Cl. 222-1.000.

Ford Motor Company: *See*—
Bailey, Wallace O., 4,708,170, Cl. 137-574.000.
Leydorf, George F., Jr.; and Pulick, Michael A., 4,708,105, Cl. 123-193.0CH.
Pardy, Ronald P., 4,708,028, Cl. 74-512.000.

Forehand, Gilbert H.; Lynch, Michael J.; Duncan, Richard L.; Tilghman, Stephen E.; and Penn, Jack C., to Halliburton Company. Power-conserving self-contained downhole gauge system. 4,709,234, Cl. 340-856.000.

Forgione, Peter S.; and Singh, Balwant, to American Cyanamid Company. Beta-hydroxyalkylcarbamyl-methylated aminotrizines and curable compositions containing the same. 4,708,984, Cl. 525-127.000.

Forpahl, Raye E.; Hostetler, Dewey L.; and Hostetler, Delmar G., to DewEze Manufacturing, Inc. Slope mower. 4,707,971, Cl. 56-6.000.

Forrest, Stephen R.; Lieberman, Robert A.; and Panock, Richard L., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Bidirectional fiber optic systems. 4,709,413, Cl. 455-606.000.

Forsberg, John W., to Lubrizol Corporation, The. Water-in-oil emulsions. 4,708,753, Cl. 149-2.000.

Forss, Bengt, to Forss Consult Ky, Kb. Fire-resistant wood composites, in particular wallboards, process for manufacture of same and use of a bonding agent in the manufacture. 4,708,910, Cl. 428-453.000.

Forss Consult Ky, Kb: *See*—
Forss, Bengt, 4,708,910, Cl. 428-453.000.

Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hansaler, Gerd, to Bayer Aktiengesellschaft. Novel 5-halogenoalkyl-1,3,4-thiadiazol-2-yloxyacetamide herbicides and fungicides. 4,708,731, Cl. 71-90.000.

Forsythe, Alan K.; and Frigon, Richard J., to Sprague Devices, Inc. Reciprocating piston fluid powered motor. 4,708,053, Cl. 91-284.000.

Forte, Francis J.: *See*—
Doyle, Michael P.; Forte, Francis J.; and Galkowski, Edward, 4,707,880, Cl. 16-38.000.

Foster, Randy C., to Dayco Products, Inc. Belt tensioner, part therefor and methods of making the same. 4,708,697, Cl. 474-135.000.

Fountoulakis, Stavros G.; Steinbicker, Richard N.; Hruskoci, Daniel E.; and Singh, Rajesh K., to Bethlehem Steel Corporation. Chemical post-treatment of selectively galvanized steel strip and sheet. 4,708,779, Cl. 204-27.000.

Fouret, Rene : *See*—
Baurand, Gilles; Fouret, Rene ; and Rundsztuk, Marek, 4,709,205, Cl. 324-127.000.

Fox, John R.; Powter, Edwin J.; and Ritchie, William K., to British Telecommunications public limited company. Wideband cable network. 4,709,418, Cl. 455-612.000.

Fox, Kenneth A.: *See*—
Weiler, Gerhard H.; Anderson, Paul A.; and Fox, Kenneth A., 4,707,966, Cl. 53-410.000.

Foxboro Company, The: *See*—
Sgourakes, George E., 4,708,010, Cl. 73-4.00R.

Foxcraft, Inc.: *See*—
Kubiak, Robert E., 4,708,221, Cl. 182-187.000.

Fradin, Boris: *See*—
Beller, Isi; and Fradin, Boris, 4,708,657, Cl. 434-185.000.

Framatome: *See*—
Desfontaines, Guy; and Le Helloco, Michel, 4,708,843, Cl. 376-219.000.

Franklin, Robert P., to Trans-World Manufacturing Corporation. Amphitheater display with end caps. 4,707,940, Cl. 40-605.000.

Fratzke, Mark E. Self-leveling fork lift apparatus. 4,708,577, Cl. 414-635.000.

Freedman, David D.: *See*—
Bednarz, James P.; and Freedman, David D., 4,709,370, Cl. 372-38.000.

Freedman, Morton: *See*—
Clark, David W.; and Freedman, Morton, 4,708,429, Cl. 350-96.200.

Freeman, Gerard L.: *See*—
Branovich, Louis E.; Freeman, Gerard L.; and Smith, Bernard, 4,708,681, Cl. 445-50.000.

French, Kenneth W.: *See*—
Bandyopadhyay, Gautam; French, Kenneth W.; Bowen, Leslie J.; and Neil, Jeffrey T., 4,708,838, Cl. 264-63.000.

Freni, Joseph L., Jr.; and Ardito, John D., to Wang Laboratories, Inc. Tilt apparatus for a display monitor. 4,708,313, Cl. 248-649.000.

Freyssinet International (STUP): *See*—
Savall, Jose; Parmentier, Claude; and Amelot, Bernard, 4,707,890, Cl. 24-122.600.

Freytag Von Loringhoven, Andreas E. T. W., to Azur Fragrances France S.A. Room deodorizer or odorizer. 4,708,851, Cl. 422-123.000.

Friedrich, Heinz: *See*—
Burger, Kurt; Friedrich, Heinz; Molkner, Thomas; and Schottle, Peter, 4,708,769, Cl. 156-659.100.

Friedrich Wilh. Schwing GmbH: *See*—
von Eckardstein, Karl-Ernst, 4,708,288, Cl. 239-9.000.

Friedwald, David, to Polycast Technology Corporation. Fastening system for interconnecting sheets of plastic materials including glass. 4,707,894, Cl. 24-459.000.

Fries, Carl J., Jr., to International Paper Company. Method and apparatus for skiving and hemming. 4,708,708, Cl. 493-357.000.

Frigon, Richard J.: *See*—
Forsythe, Alan K.; and Frigon, Richard J., 4,708,053, Cl. >1-284.000.

Fringant, Jean C.: *See*—
Pieri, Roger; and Fringant, Jean C., 4,709,191, Cl. 315-370.000.

Froebel, Gerd; and Stang, Hans W., to Alpha Grillo-Lotsysteme GmbH. Halogen-free foam fluxes. 4,708,751, Cl. 148-23.000.

Frohlich, Alfons, to Opti Patent-, Forschnungs-und Fabrikations-AG. Process and apparatus for making coupled slide fasteners. 4,707,901, Cl. 29-408.000.

Frost, Meryll M., Jr.: *See*—
Morrison, John; Siskind, Eric J.; and Frost, Meryll M., Jr., 4,709,332, Cl. 364-414.000.

Fryda, Georg; and Hehn, Wilfried, to Agfa-Gevaert Aktiengesellschaft. Arrangement for wet processing photosensitive materials. 4,708,453, Cl. 354-320.000.

Frye, Ricky J., to MIM Industries, Inc. Tape feeding apparatus. 4,708,072, Cl. 112-121.270.

Fryling, Charlotte M.: *See*—
Iwata, Kenneth K.; Fryling, Charlotte M.; and Todaro, George J., 4,708,948, Cl. 514-2.000.

Fuchs, Otto: *See*—
Schindler, Abbott M.; and Fuchs, Otto, 4,707,948, Cl. 51-216.00R.

Fugger, Gerhard: *See*—
Nagl, Michael; Fugger, Gerhard; Mraz, Jaroslav; Mailander, Horst; Kottenmanner, Ernst; Rauber, Norbert; and Luger, Wolfgang, 4,708,643, Cl. 432-95.000.

Fuji Heavy Industries, Ltd.: *See*—
Noto, Yasuo; and Sugimoto, Shun-ichiro, 4,708,220, Cl. 180-142.000.

Fuji Jukogyo Kabushiki Kaisha: *See*—
Kitade, Nobumitsu, 4,708,227, Cl. 192-0.055.
Morimoto, Yoshihiko; and Tezuka, Kazunari, 4,708,031, Cl. 74-866.000.
Sakai, Yasuhito, 4,708,694, Cl. 474-28.000.

Fuji Oil Company, Limited: *See*—
Yokoyama, Hitoshi; and Iwanaga, Yukiya, 4,708,876, Cl. 426-33.000.

Fuji Photo Film Co., Ltd.: *See*—
Akao, Mutsuo, 4,708,896, Cl. 428-35.000.
Akimoto, Taizo; and Kawai, Masahiko, 4,709,268, Cl. 358-150.000.
Kondoh, Masahiko; and Matsuoka, Hiroshi, 4,708,463, Cl. 355-45.000.
Okamura, Hisashi; Kawamoto, Hiroshi; and Sakakibara, Yoshio, 4,708,927, Cl. 430-564.000.
Shimizu, Shigehisa; and Otokozawa, Takao, 4,709,157, Cl. 250-572.000.
Suzuki, Kenji, 4,709,259, Cl. 358-48.000.
Tamada, Kazukiyo, 4,709,282, Cl. 360-97.000.
Urabe, Hitoshi, 4,708,448, Cl. 354-75.000.
Yokoya, Hiroaki; Sano, Kenji; and Sato, Hideo, 4,708,922, Cl. 430-73.000.

Fuji Tec Co., Ltd.: *See*—
Hashimoto, Kenzaburo, 4,708,557, Cl. 411-387.000.

Fuji Xerox Co., Ltd.: *See*—
Takahashi, Haruhiko; Inui, Toshiharu; Saitoh, Hiroyuki; Ishikawa, Noriyoshi; Funato, Hitoshi; Ohmori, Takashi; Kurata, Masami; and Katou, Yasuo, 4,709,149, Cl. 250-317.100.

Fujie, Masakatsu: *See*—
Hosoda, Yuji; Honma, Kazuo; Fujie, Masakatsu; Iwamoto, Taro; Kamejima, Kohji; and Nakano, Yoshiyuki, 4,709,342, Cl. 364-558.000.

Fujii, Takayoshi: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,708,950, Cl. 514-42.000.

Fujii, Toru; Takase, Hiroshi; and Imairumi, Masaki, to Olympus Optical Co., Ltd. Varifocal lens system. 4,708,442, Cl. 350-422.000.

Fujii, Toshinori; and Okamoto, Shinji, to Matsushita Electric Works, Ltd. Method for drilling reference holes in multi-layer printed wiring board assembly. 4,708,545, Cl. 409-131.000.

Fujikawa, Atsunobu: *See*—
Midooka, Masanori; Kubo, Takashi; Fujikawa, Atsunobu; and Motoda, Masanori, 4,708,351, Cl. 277-184.000.

Fujiki, Kuniharu: *See*—
Sekiya, Satoshi; Matsumoto, Ikuo; and Fujiki, Kuniharu, 4,708,906, Cl. 428-336.000.

Fujitaki, Roy K.: *See*—
Keck, Henry C.; and Fujitaki, Roy K., 4,707,933, Cl. 34-97.000.

Fujitsu Limited: *See*—
Higuchi, Mitsuo; and Tsuchida, Manabu, 4,709,165, Cl. 307-350.000.

Fujiu, Takamitsu; Mochida, Masaaki; and Ogino, Makoto, to Nippon Kogaku K. K. Apatite composite ceramics. 4,708,652, Cl. 433-201.100.

Fujiwara, Haruyoshi; Makino, Tetsuo; and Iwata, Hiroshi, to Mitsubishi Jukogyo Kabushiki Kaisha. Impermeable plate for uniformly dispersing paper raw material in a twin wire paper former. 4,708,773, Cl. 162-300.000.

Fujiwara, Hiroshi; Matsumoto, Tadashi; and Sekiya, Masaaki, to Maruzen Petrochemical Co., Ltd. Method for the production of reformed p-vinylphenol polymers which are lightened in color. 4,709,009, Cl. 528-481.000.

Fujiwara, Makoto; Yoneda, Hajime; and Okamoto, Masafumi, to Matsushita Electric Industrial Co., Ltd. Electric double layer capacitor. 4,709,303, Cl. 361-433.000.

Fujiwara, Setuzo: *See*—
Hashizume, Masatora; Kadoh, Eiichi; Fujiwara, Setuzo; and Shiomi, Hitomi, 4,707,893, Cl. 24-446.000.

Fujiwara, Yoshinari: *See*—
Tabata, Toshiyuki; Aikawa, Hiroshi; Fujiwara, Yoshinari; and Yoda, Norio, 4,708,329, Cl. 267-140.100.

Fukasawa, Tetsuo; Kawamura, Fumio; and Kikuchi, Makoto, to Hitachi, Ltd. Method of solidifying radioactive solid waste. 4,708,822, Cl. 252-628.000.

Fukazawa, Tetsuo; and Yokoyama, Shigeyoshi, to Nihon Radiator Co., Ltd.; and Pacific Machinery & Engineering Co., Ltd. Centrifugal pump. 4,708,585, Cl. 415-72.000.

Fukuda, Robert C.; and Chandra, Suresh, to United States of America, Army. Side-arm phase-conjugated laser. 4,709,368, Cl. 372-10.000.

Fukuda, Tokuya, to Sony Corporation. Apparatus for magnetically recording and/or reproducing two-channel audio signals together with a color video signal in successive oblique tracks on a magnetic tape. 4,709,275, Cl. 358-310.000.

Fukuda, Yasuko: *See*—
Namiki, Mitsuo; Osawa, Toshihiko; Fukuda, Yasuko; and Ozaki, Tatsuhiko, 4,708,820, Cl. 252-398.000.

Fukui, Masami: *See*—
Kishi, Hiroshi; Oshio, Minoru; Murai, Shunji; Wada, Takeshi; and Fukui, Masami, 4,709,299, Cl. 361-321.000.

Fukui, Noboru: *See*—
Takada, Toshiyuki; Fukui, Noboru; and Shimizu, Akihito, 4,707,986, Cl. 60-310.000.

Fukumori, Katuaki: *See*—
Shimokawa, Wataru; and Fukumori, Katuaki, 4,708,821, Cl. 512-12.000.

Fukumoto, Fumio: *See*—
Otsuki, Hajime; Ishii, Kenjiro; Satoh, Yutaka; and Fukumoto, Fumio, 4,708,464, Cl. 355-45.000.

Fukumoto, Yasuhisha; and Moriyama, Moboru, to Kao Corporation. Production of polymaleic acid. 4,709,091, Cl. 562-595.000.

Fukumura, Kagenori: *See*—
Harada, Yoshiharu; Taga, Yutaka; Fukumura, Kagenori; Hayakawa, Yoichi; and Kawai, Masao, 4,708,032, Cl. 74-866.000.

Fukumura, Keiichi: *See*—
Ohta, Hiromi; Ogawa, Shinji; Kajikawa, Yosiharu; Fukumura, Keiichi; Tsuchiya, Kiyomitsu; Kittaka, Kiyoshi; and Narita, Katsushi, 4,707,999, Cl. 62-474.000.

Fuller Company: *See*—
Lawall, Thomas R.; and Lukacz, Stephen A., 4,708,644, Cl. 432-106.000.

Funada, Fumiaki: *See*—
Ishii, Yutaka; Nakagawa, Kenichi; and Funada, Fumiaki, 4,708,439, Cl. 350-331.00R.

Funato, Hitoshi: *See*—
Takahashi, Haruhiko; Inui, Toshiharu; Saitoh, Hiroyuki; Ishikawa, Noriyoshi; Funato, Hitoshi; Ohmori, Takashi; Kurata, Masami; and Katou, Yasuo, 4,709,149, Cl. 250-317.100.

Funato, Kazuhiko: *See*—
Harada, Osamu; Takeda, Yuji; Suematsu, Toshio; Anzai, Katsushi; and Funato, Kazuhiko, 4,708,113, Cl. 123-425.000.

Funatsu, Ryuuichi: *See*—
Komeyama, Yoshihiro; Kembo, Yukio; Kuni, Asahiro; Funatsu, Ryuuichi; Inagaki, Akira; Ikeda, Minoru; and Okamoto, Keiichi, 4,708,484, Cl. 356-401.000.

Furnas Electric Company: *See*—
Miller, Larry G.; Whiting, Harold E.; and Willcox, Dale, 4,709,126, Cl. 200-83.00P.

Furuta, Yoichi: *See*—
Nakamura, Kaoru; Sakata, Shinji; Ochiai, Chiaki; Furuta, Yoichi; and Tsubouchi, Kaoru, 4,707,989, Cl. 60-589.000.

Fused Kontacts of Chicago: *See*—
Chapman, Dwain R., 4,709,066, Cl. 556-437.000.

Futamura, Shoji: *See*—
Ozaki, Sei; and Futamura, Shoji, 4,707,904, Cl. 29-445.000.
Yoda, Yasutada; Sueyasu, Seisuke; and Futamura, Shoji, 4,708,609, Cl. 425-28.00D.

G. D. Searle & Co.: *See*—
Manley, Paul W., 4,708,958, Cl. 514-274.000.

Gaa, Roland; and Kinzel, Richard, to Motoren-Werke Mannheim Aktiengesellschaft. Injection system for a diesel engine with a high pressure injection pump for each cylinder. 4,708,116, Cl. 123-506.000.

Gaastra Sails International Ltd.: *See*—
Magnan, Jeffrey J., 4,708,079, Cl. 114-103.000.

Gabetta, Bruno: *See*—
Bombardelli, Ezio; Gabetta, Bruno; and Conti, Marisa, 4,709,076, Cl. 560-55.000.

Gagliani, John: *See*—
Long, John V.; and Gagliani, John, 4,708,972, Cl. 521-185.000.

Gaigl, Dietmar; and Amann, Klaus, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Antifogging device for a display glass of an indicating instrument. 4,709,134, Cl. 219-201.000.

Gain, Lorand H., Jr.: *See*—
Sharp, Steve M.; Holstrom, John R.; Gain, Lorand H., Jr.; and Ballun, John V., 4,708,160, Cl. 137-368.000.

Gain, Robert; Simon, Jacques; Pasturel, Andre ; and Roger, Marc, to Commissariat a l'Energie Atomique; and L'Etat Francais. Process for

producing an artificial cranium and a prosthetic head. 4,708,836, Cl. 264-40.100.
Galaj, Stanislas, to Compagnie Generale d'Electricite. Method and device for filtering a suspension of particles in a liquid. 4,708,801, Cl. 210-636.000.
Galkowski, Edward: *See*—
Doyle, Michael P.; Forte, Francis J.; and Galkowski, Edward, 4,707,880, Cl. 16-38.000.
Gallagher, Patrick K.: *See*—
Chandross, Edwin A.; Dean, Robert E.; Gallagher, Patrick K.; Levy, Roland A.; Schrey, Frank; and Smolinsky, Gerald, 4,708,884, Cl. 427-39.000.
Gallant, Ben J., to Airsonics License Partnership. Particle feed device with reserve supply. 4,708,534, Cl. 406-75.000.
Gallard, Henry: *See*—
Allard, Vincent L.; and Gallard, Henry, 4,708,298, Cl. 242-25.00A.
Gallien, Arnold: *See*—
Wenske, Hanno; Gallien, Arnold; Kauschinger, Martin; Unger, Klaus; Brendel, Josef; and Lampe, Lutz, 4,709,182, Cl. 310-316.000.
Gallo, Robert C.: *See*—
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435-5.000.
Gambino, Salvatore: *See*—
Silvestri, Giuseppe; Gambino, Salvatore; and Filardo, Giuseppe, 4,708,780, Cl. 204-59.00R.
Gambro Lundia AB: *See*—
Larsson, Lars-Ake L.; Nilsson, Ake W.; Johannson, Bo Ingemar W.; and Naucler, Lars Olof V., 4,708,714, Cl. 604-5.000.
Gammons, Robert C., to Olin Corporation. Foam dispensing gun with improved mixing chamber. 4,708,292, Cl. 239-414.000.
Ganebac, Inc.: *See*—
Olson, Gary M., 4,708,148, Cl. 128-781.000.
GAO Gesellschaft fur Automation und Organisation mbH: *See*—
Haghiri-Tehrani, Yahya; and Hoppe, Joachim, 4,709,254, Cl. 357-72.000.
Garcia Cascajosa, Felix, to Latimer N.V. Flow energy conversion machine. 4,707,978, Cl. 60-39.350.
Garner, John N.: *See*—
Baxter, Gordon D.; Grant, James C.; and Garner, John N., 4,708,887, Cl. 427-118.000.
Garner, Terry N.: *See*—
Schaefer, Henry A.; and Garner, Terry N., 4,709,201, Cl. 320-2.000.
Garrett Corporation, The: *See*—
Denk, Joseph, 4,709,180, Cl. 310-179.000.
Garrett Electronics, Inc.: *See*—
Podhrasky, Robert J., 4,709,213, Cl. 324-329.000.
Garrison, William E., Jr., to Du Pont de Nemours, E. I., and Company. Flame retardant polyethylene terephthalate. 4,708,980, Cl. 524-412.000.
Garrou, Philip E.: *See*—
Jung, Chu W.; Garrou, Philip E.; and Strickler, Gary R., 4,709,115, Cl. 585-643.000.
Garthoff, Bernward: *See*—
Ingendoh, Axel; Meyer, Horst; and Garthoff, Bernward, 4,709,031, Cl. 544-333.000.
Gasteier, Rolf: *See*—
Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; Gasteier, Rolf; and Erlecke, Jens, 4,709,197, Cl. 318-480.000.
Gateway Industries, Inc.: *See*—
Doty, Gerald A., 4,708,364, Cl. 280-806.000.
Doty, Gerald A., 4,708,366, Cl. 280-803.000.
Gearhart Industries, Inc.: *See*—
Maki, Voldi E., Jr., 4,709,357, Cl. 367-35.000.
Gebhard, Robert S.: *See*—
Matviya, Thomas M.; Gebhard, Robert S.; and Greenbank, Michael, 4,708,853, Cl. 423-210.000.
Gebruder Buhler AG: *See*—
Brugger, Werner, 4,708,620, Cl. 425-154.000.
Gebruder Weiss K. G.: *See*—
Greeb, Herbert, 4,708,567, Cl. 414-310.000.
Gebruder Welger GmbH & Co. Kommanditgesellschaft: *See*—
Rohrbein, Jurgen, 4,708,565, Cl. 414-86.000.
Geddes, Leslie A.: *See*—
Tacker, Willis A., Jr.; Bourland, Joe D.; Babbs, Charles F.; and Geddes, Leslie A., 4,708,145, Cl. 128-419.00D.
Geddie, John D.: *See*—
McMahan, David R.; and Geddie, John D., 4,709,305, Cl. 362-61.000.
Geerts, Wilhelmus H. M.; Stok, Filippus L.; and Tienkamp, Engbert, to U.S. Philips Corporation. Color television camera with test image projector and precompensation means for correcting for imaging errors caused by oblique angles of incidence of test images on pickup elements. 4,709,260, Cl. 358-51.000.
Gehman, Roland P.; and Martin, Raymond G., to MGS, Inc. Disabled truck tractor recovery unit. 4,708,358, Cl. 280-402.000.
Gehrmann, Rainer, to Robert Bosch GmbH. Process and circuit for avoiding of nonlinearities and brightening on the picture edges in television pick up tubes. 4,709,192, Cl. 315-371.000.
Geisler, Thomas C., to Minnesota Mining and Manufacturing Company. Photothermographic element comprising particles each containing silver halide, a silver compound and reducing agent. 4,708,928, Cl. 430-619.000.
General Dynamics, Pomona Division: *See*—
Shores, Marvin W., 4,709,121, Cl. 174-35.00R.
Wedertz, Larry D.; and Swann, Lynn J., 4,708,304, Cl. 244-3.260.
General Electric Company: *See*—
Crawford, Carl R., 4,709,333, Cl. 364-414.000.
Derderian, Scott K., 4,709,181, Cl. 310-214.000.
Kaminski, Christopher A., 4,709,177, Cl. 310-59.000.
MacFall, James R.; and Glover, Gary H., 4,709,212, Cl. 324-309.000.
Ngo, Khai D. T.; and Peterson, William A., 4,709,316, Cl. 363-21.000.
Rich, Jonathan D., 4,709,054, Cl. 549-214.000.
Roberts, Victor D., 4,709,188, Cl. 315-178.000.
Schaefer, Henry A.; and Garner, Terry N., 4,709,201, Cl. 320-2.000.
Sullivan, Jack O., 4,708,536, Cl. 407-41.000.
West, Paul R.; and Davis, Gary C., 4,709,107, Cl. 568-927.000.
General Motors Corporation: *See*—
Klomp, Edward D., 4,708,400, Cl. 301-38.00S.
Lederman, Frederick E., 4,708,497, Cl. 384-448.000.
McMahan, David R.; and Geddie, John D., 4,709,305, Cl. 362-61.000.
Schroeder, Diane M., 4,708,413, Cl. 439-358.000.
General Signal Corporation: *See*—
Ehrler, Arthur J., 4,708,721, Cl. 55-40.000.
Genfoot, Inc.: *See*—
Champagne, Michel R., 4,707,874, Cl. 12-142.00E.
Genter, Claude: *See*—
Arnoux, Daniel; Genter, Claude; and Anton, Christian, 4,708,422, Cl. 350-96.150.
Geophysical Engineering Company: *See*—
Assaf, Gad, 4,707,993, Cl. 62-94.000.
Georges, Philip,e, to Institut de Recherches de la Siderurgie Francaise—IRSID. Induction heating system for reheating the edges of a metallurgical product and variable air gap inductor associated therewith. 4,708,325, Cl. 266-90.000.
Georgitsis, Nikolaos: *See*—
Schneider, Ortwin; and Georgitsis, Nikolaos, 4,708,023, Cl. 73-863.310.
Gephart, Don A.; and Powell, Jeffrey M., to Liebert Corporation. UPS apparatus with control protocols. 4,709,318, Cl. 363-37.000.
Gerber Scientific Products, Inc.: *See*—
Wood, Kenneth O., 4,708,901, Cl. 428-131.000.
Gerber, Terry L., to Ashley Worldwide, Inc. Convertible outerwear garment. 4,707,862, Cl. 2-93.000.
Gerlach, Klaus; Kessler, Erich; and Henne, Werner. Hollow fiber membrane for plasma separation. 4,708,799, Cl. 210-500.230.
Gersbach, Klaus: *See*—
Bisping, Bernhard; Gersbach, Klaus; and Romer, Rudolf, 4,708,064, Cl. 102-517.000.
Gershen, Bernard; Rosenbaum, Saul; and Pearse, James N., to Leviton Manufacturing Company, Inc. Shock hazard protection system. 4,709,293, Cl. 361-50.000.
Gerth, Christian; and Droscher, Michael, to Huels Aktiengesellschaft. Process for producing thermoplastic molding compositions from polycondensation resins and aqueous latexes. 4,708,986, Cl. 525-177.000.
Gewerkschaft Eisenhutte Westfalia GmbH: *See*—
Plenter, Dieter, 4,708,531, Cl. 405-296.000.
Trox, Uwe; and Kussel, Willy, 4,708,394, Cl. 299-1.000.
Geysen, Hendrik, to Commonwealth Serum Laboratories Commission. Antigenically active amino acid sequences. 4,708,871, Cl. 424-88.000.
Ghezzi, Franco: *See*—
Flutti, Fulvio; and Ghezzi, Franco, 4,708,907, Cl. 428-352.000.
Gibert, Francois: *See*—
Deux, Alain; Merant, Jean-Camille; Gibert, Francois; and Berger, Antoine, 4,707,973, Cl. 56-328.00R.
Gibot, Claude; and Charles, Jean-Michel, to Carboxyque Francaise. Installation for the projection of particles of dry ice. 4,707,951, Cl. 51-410.000.
Giese, Roger W., to Northeastern University. Molecular analytical release tags and their use in chemical analysis. 4,709,016, Cl. 530-389.000.
Giesl, Johann, to Elektromanufaktur Zangenstein Hanauer GmbH & Co. Circuit for the continuous watching of the grounding resistance of electrical appliances. 4,709,164, Cl. 307-326.000.
Gilligan, James P.; and Jones, Barry N., to Unigene Laboratories, Inc. α-amidation enzyme. 4,708,934, Cl. 435-68.000.
Gillon, Willard A., Jr., to Rockwell International Corporation. Flexure disc sealed integral bipropellant valve and injector valve assembly. 4,707,983, Cl. 60-258.000.
Giocastro, James: *See*—
Giocastro, Joseph; Giocastro, Peter; and Giocastro, James, 4,708,106, Cl. 123-197.0AC.
Giocastro, Joseph; Giocastro, Peter; and Giocastro, James. Acute angle crankarm transmitting reciprocating motion in a rotary fashion. 4,708,106, Cl. 123-197.0AC.
Giocastro, Peter: *See*—
Giocastro, Joseph; Giocastro, Peter; and Giocastro, James, 4,708,106, Cl. 123-197.0AC.
Giuliani, John F., to United States of America, Navy. Optical waveguide sensor for methane gas. 4,708,941, Cl. 436-141.000.
Gladstone, Philip J. S.: *See*—
Beale, Nicholas C. L.; Rushbrooke, Roger W.; and Gladstone, Philip J. S., 4,709,365, Cl. 371-11.000.
Glaenzer Spicer: *See*—
Orain, Michel A., 4,708,693, Cl. 464-111.000.
Glaser, Luis: *See*—
Adams, Steven P.; Towler, Dwight A.; and Glaser, Luis, 4,709,012, Cl. 530-328.000.
Glass Incorporated International: *See*—
Lewis, Albert, 4,708,848, Cl. 420-585.000.

Glassco, John M.: *See*—
Glassco, Margaret M.; and Glassco, John M., 4,707,870, Cl. 4-661.000.
Glassco, Margaret M.; and Glassco, John M. Toilet seat or cover retaining device. 4,707,870, Cl. 4-661.000.
Glenz, Wolfgang: *See*—
Bathelt, Heinrich; Ehrl, Winfried; Wehowsky, Frank; Kleber, Rolf; Lotz, Werner; Glenz, Wolfgang; Herdt, Hubert; Jackel, Lothar; Mast, Jan-Hilbert; Hintermeier, Karl; and Muller, Manfred, 4,709,074, Cl. 560-33.000.
Glinka, Jerome: *See*—
Dolfini, Joseph E.; and Glinka, Jerome, 4,709,098, Cl. 568-491.000.
Globol Werk GmbH: *See*—
von Philipp, Fritz; and Hautmann, Horst, 4,707,866, Cl. 4-228.000.
Glover, Gary H.: *See*—
MacFall, James R.; and Glover, Gary H., 4,709,212, Cl. 324-309.000.
Gluzek, Karl-Heinz: *See*—
Osterburg, Gunther; Gluzek, Karl-Heinz; and Neier, Wilhelm, 4,709,106, Cl. 568-917.000.
GMF Robotics Corporation: *See*—
Akeel, Hadi A., 4,708,580, Cl. 414-735.000.
Janashak, Robert J.; Felice, Christopher G.; and Akeel, Hadi A., 4,708,175, Cl. 141-1.000.
Godtfredsen, Sven E.; Ottesen, Martin; and Larsen, Bent A., to De Forenede Bryggerier A/S. Production of fermented alcoholic products having a low diacetyl content. 4,708,875, Cl. 426-12.000.
Goebel, William K.: *See*—
Myers, Drewfus Y., Jr.; Alexandrovich, Peter S.; Pearce, Glenn T.; Santilli, Domenic; Sreekumar, Chandrasekha; Berwick, Martin A.; Upson, Donald A.; and Goebel, William K., 4,708,923, Cl. 430-112.000.
Goel, Anil B.; and Tufts, Timothy A., to Ashland Oil, Inc. Bicyclic amide acetal/polyisocyanate polymers. 4,708,971, Cl. 521-167.000.
Goel, Anil B., to Ashland Oil, Inc. Oxazoline containing multifunctional monomer. 4,709,040, Cl. 548-237.000.
Goetz, Klaus: *See*—
Schaeffer, Norbert; Bettinger, Gunter; Goetz, Klaus; Pfefferkorn, Dietmar; Burkle, Ottmar; Schmidts, Kurt; Schneider, Pierre; Wagner, Werner; Wietholter, Dieter; Dietze, Herbert; and Andriessen, Wilhelmus, 4,709,288, Cl. 360-130.210.
Goetz, Willi, to Valmet-Strecker GmbH. Apparatus for feeding a machine with a plurality of webs of material from a plurality of web supply rolls. 4,708,300, Cl. 242-58.100.
Gohdo, Shigeru: *See*—
Ohta, Harutaka; Miyamoto, Kazuchiyo; Terayama, Arataro; Maruhashi, Seiji; and Gohdo, Shigeru, 4,708,082, Cl. 114-230.000.
Gold Star Co., Ltd.: *See*—
Kim, Young H., 4,709,289, Cl. 360-130.240.
Goldberg, Benjamin L.; and Mercurio, Dominic G., to Coleco Industries, Inc. Rolling figure toy. 4,708,687, Cl. 446-269.000.
Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; Gasteier, Rolf; and Eriecke, Jens, to Feinwerktechnik Schleicher & Co. Control device for driving e.g. a shredding machine or a similar machine. 4,709,197, Cl. 318-480.000.
Goldman, Jerome; Goldman, Marvin; Phillips, Gerald; Goldman, Terry; and Pesin, Joseph, to Penn Plax Plastics, Inc. Animal habitat system for use in an animal enclosure. 4,708,089, Cl. 119-5.000.
Goldman, Marvin: *See*—
Goldman, Jerome; Goldman, Marvin; Phillips, Gerald; Goldman, Terry; and Pesin, Joseph, 4,708,089, Cl. 119-5.000.
Goldman, Terry: *See*—
Goldman, Jerome; Goldman, Marvin; Phillips, Gerald; Goldman, Terry; and Pesin, Joseph, 4,708,089, Cl. 119-5.000.
Goldstein, Gideon: *See*—
Kung, Patrick C.; and Goldstein, Gideon, 4,709,015, Cl. 530-387.000.
Goldstein, Richard: *See*—
Popowski, James J.; and Goldstein, Richard, 4,709,230, Cl. 340-703.000.
Gonmier, Herve ; and Lamblin, Jean-Michel, to Draftex Industries Limited. Sealing strips. 4,708,898, Cl. 428-36.000.
Gonczi, Csaba: *See*—
Heja, Gergely; Korbonits, Dezso ; Palosi, Endre; Kiss, Pal; Gonczi, Csaba; Szvoboda nee Kanzel, Ida; Marvanyos, Ede; Kun, Judit; Szomor nee Wundele, Maria; Szabo, Gabor; Kallay, Tamas; and Ledniczky, Laszlo , 4,709,081, Cl. 560-100.000.
Gongwer, Calvin A.: *See*—
Appling, James; and Gongwer, Calvin A., 4,709,358, Cl. 367-106.000.
Goralnik, Charles D. Lamp socket and light fixture connection. 4,709,313, Cl. 362-414.000.
Goris, Gregg A., to Vetco Gray Inc. Remote guideline connector. 4,708,524, Cl. 405-169.000.
Gors, Heinrich C.: *See*—
Jansons, Viktors; and Gors, Heinrich C., 4,709,007, Cl. 528-222.000.
Goto, Hisashi; and Ogata, Yasuji, to Olympus Optical Co., Ltd. Zoom lens system. 4,708,443, Cl. 350-427.000.
Goto, Hisashi, to Olympus Optical Co., Ltd. Large aperture ratio photographic lens system. 4,708,445, Cl. 350-454.000.
Goto, Shigetada: *See*—
Mizohata, Fumio; and Goto, Shigetada, 4,709,161, Cl. 307-270.000.
Goto, Takakiyo: *See*—
Nishibayashi, Hideyuki; Iio, Shigeyoshi; Watanabe, Fumio; and Goto, Takakiyo, 4,709,090, Cl. 562-537.000.
Goto, Toshio: *See*—
Kurahashi, Yoshio; Shiokawa, Kozo; Goto, Toshio; Kagabu, Shinzo; Matsumoto, Noboru; and Moriya, Koichi, 4,708,953, Cl. 514-166.000.
Goto, Touru; and Konishi, Takashi, to Mitsubishi Jukogyo Kabushiki Kaisha. Method for evaluating residual fatigue life of mechanical parts. 4,709,383, Cl. 378-72.000.
Gouali, Mohamed; Roullet, Gerald; and Voisin, Oliver, to Lignes Telegraphiques et Telephoniques Ltt. Bidirectional optical wavelength multiplexer-demultiplexer. 4,708,425, Cl. 350-96.160.
Governale, Bernard C., to Peachtree Doors, Inc. Muntin assembly and method of installing. 4,707,963, Cl. 52-741.000.
Graber, Werner; and Slavik, Walter, to Rieter Machine Works, Ltd. Open end yarn piecer. 4,707,976, Cl. 57-263.000.
Grafe, Robert J.; and Pancoast, Steven T., to International Business Machines Corporation. Method and apparatus for distinguishing between diskettes in a diskette drive. 4,709,367, Cl. 371-38.000.
Graham, John J., Jr.; Huber, Joseph C., Jr.; and Neumann, John E., to Loral Corporation. Low-drag, ram-air inflated, millimeter wave, passive radar decoy. 4,709,235, Cl. 342-10.000.
Granger, Robert A. Lathe mounting apparatus. 4,708,041, Cl. 82-40.00R.
Grangette, Henri; Llinares, Michel; Bossand, Bernard; and Faure, Alain, to Societe Anonyme Elf France. Protection of hydrocarbons against the action of microorganisms. 4,708,720, Cl. 44-51.000.
Granot, Daniel: *See*—
Servi, Rami; Eidelberg, Boaz; Granot, Daniel; Armoza, Ehud; and Sher, Ephraim, 4,708,333, Cl. 270-45.000.
Granqvist, Iage H.: *See*—
Bylehn, Bo V. S.; and Granqvist, Iage H., 4,708,829, Cl. 261-62.000.
Grant, Brian T. Container holder. 4,708,273, Cl. 224-252.000.
Grant, James C.: *See*—
Baxter, Gordon D.; and Grant, James C., 4,708,837, Cl. 264-40.400.
Baxter, Gordon D.; Grant, James C.; and Garner, John N., 4,708,887, Cl. 427-118.000.
Grapha-Holding AG: *See*—
Merkli, Peter; and Jermann, Daniel, 4,708,561, Cl. 412-25.000.
Grate, John H.; and Hamm, David R., to Catalytica Associates; and Haldor Topsoe. Process for the preparation of urethanes. 4,709,073, Cl. 560-24.000.
Gray, Robert L., Jr., to Union Carbide Corporation. Total isomerization process and apparatus. 4,709,117, Cl. 585-738.000.
Graziadio, Mario; and Ligasacchi, Sergio, to Enel-Ente Nazionale per l'Energia Elettrica. Atomizer for viscous liquid fuels. 4,708,293, Cl. 239-427.000.
Grebur, Dennis J.: *See*—
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,708,995, Cl. 525-450.000.
Greeb, Herbert, to Gebruder Weiss K. G. Motive power device for a delivery device for a silo or a similar upright container. 4,708,567, Cl. 414-310.000.
Green, Norman, to Allied Corporation. Sequential mono-lobe tracker. 4,709,238, Cl. 342-427.000.
Greenbank, Michael: *See*—
Matviya, Thomas M.; Gebhard, Robert S.; and Greenbank, Michael, 4,708,853, Cl. 423-210.000.
Greenfield Industries, Inc.: *See*—
Emanuelli, Dino J., 4,708,542, Cl. 408-144.000.
Greenstreet, Arthur W.: *See*—
Hergenrother, William L.; and Greenstreet, Arthur W., 4,708,987, Cl. 525-184.000.
Greguoli, Richard A., to Cly-Del Manufacturing Company, The. Adjustable cam indexing feed apparatus. 4,708,043, Cl. 83-219.000.
Greig, Walter G., to Moore Business Forms, Inc. Multiple ply, alteration-inhibited stock for a match-the-hidden-indicia game. 4,708,369, Cl. 283-108.000.
Greischel, Andreas: *See*—
Brickl, Rolf; Schepky, Gottfried; Rupprecht, Eckhard; and Greischel, Andreas, 4,708,868, Cl. 924-80.000.
Grenacher, Armin V.; Strohmeyer, Max; Hoffmann, Herwig; and Ellichausen, Heinrich, to BASF Aktiengesellschaft. Preparation of C_3-C_{25}-alkanols. 4,709,105, Cl. 568-883.000.
Grey, Michael O.: *See*—
Bangs, Richard G.; and Grey, Michael O., 4,708,500, Cl. 400-120.000.
Griffin & Company, Inc.: *See*—
Bultman, Marten; and Wilding, Edwin L., 4,708,238, Cl. 198-835.000.
Griffin, Dana K., to Tu-Way Products Company. Wet mop liquid extractor. 4,707,877, Cl. 15-261.000.
Griffin, James G.: *See*—
Schwarz, Frederick M.; and Griffin, James G., 4,708,588, Cl. 415-115.000.
Griffin, Roger B.: *See*—
Taylor, Peter; and Griffin, Roger B., 4,708,548, Cl. 409-234.000.
Grimm, Wolfgang: *See*—
Diamantoglou, Michael; Magerlein, Helmut; Brodowski, Walter; Grimm, Wolfgang; and Meyer, Gerhard, 4,708,985, Cl. 525-166.000.
Grinstead, Robert R., to Dow Chemical Company, The. Process for the removal of NO from fluid streams using a water-soluble polymeric chelate of a polyvalent metal. 4,708,854, Cl. 423-235.000.
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van de Klundert, Louis J. M.; ten Kate, Herman H. J.; Sikkenga, Jan; Groenenboom, Maarten; and Lisser, Jacques, 4,709,314, Cl. 363-14.000.

Grommes, Robert J. Hat drying form. 4,708,271, Cl. 223-25.00C.

Gruber, Bernhard: *See*—
Baur, Rolf; and Gruber, Bernhard, 4,708,797, Cl. 210-330.000.

Gruber, Peter: *See*—
Muller, Kurt; Gruber, Peter; and Wuthrich, Alfred, 4,709,152, Cl. 250-342.000.

Gruber, Werner: *See*—
Dohr, Manfred; Wiemers, Norbert; and Gruber, Werner, 4,708,973, Cl. 523-102.000.

Gruber, Wolfgang: *See*—
Rauscher, Elli; Schaich, Eugen; Neumann, Ulrich; Wahlefeld, August; Gruber, Wolfgang; and Empl, Bernhard, 4,709,020, Cl. 536-17.800.

Grudem, Charles M. Lumbar dynamic splint. 4,708,130, Cl. 128-78.000.

Gruest, Jacqueline: *See*—
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Daugnet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435-5.000.

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Chang, Ping W.; Gruetzmacher, Gordon D.; Meltz, Clifford N.; and Totino, Rocco A., 4,708,974, Cl. 523-130.000.

Grumman Aerospace Corporation: *See*—
Kopaco, Michael A.; and Markow, Edward G., 4,708,186, Cl. 152-516.000.

Grundy, Michael J., to Toro Company, The. Oscillating sprinkler. 4,708,291, Cl. 239-242.000.

Grussing, Theodore: *See*—
Axelgaard, Jens; and Grussing, Theodore, 4,708,149, Cl. 128-798.000.

GTE Laboratories Incorporated: *See*—
Bandyopadhyay, Gautam; French, Kenneth W.; Bowen, Leslie J.; and Neil, Jeffrey T., 4,708,838, Cl. 264-63.000.
Buljan, Sergei-Tomislav V.; Lingertat, Helmut; Baldoni, J. Gary, II; and Saria, Vinod K., 4,708,037, Cl. 82-1.00C.
Rubner, Michael; and Sichel, Enid K., 4,708,019, Cl. 73-760.000.

GTE Products Corporation: *See*—
Hsieh, Martin Y.; and Mizuhara, Howard, 4,708,943, Cl. 501-98.000.
Keeffe, William M.; and Krasko, Zeya K., 4,709,184, Cl. 313-638.000.
Roche, William J., 4,709,187, Cl. 315-74.000.

GTE Valeron Corporation: *See*—
Noggle, Kenneth G., 4,708,546, Cl. 409-200.000.
Plutschuck, Lawrence; and Hunt, Carl E., 4,708,543, Cl. 408-151.000.

Guenther, Dieter: *See*—
Bender, Albert; and Guenther, Dieter, 4,709,026, Cl. 544-3.000.

Guerillot, Yves M. N., to Societe Anonyme de Telecommunications. Method and device for inserting a digital signal in a channel with higher flow rate. 4,709,227, Cl. 340-347.0DD.

Guerra, Romeo E. Apparatus and method for inserting a foot into a boot. 4,708,272, Cl. 223-113.000.

Guezou, Jean-Pierre: *See*—
Balquet, Robert; Baubeau, Robert; Bertrand, Jean-Paul; Guezou, Jean-Pierre; and Carron, Philippe, 4,708,077, Cl. 114-67.00A.

Guntert, Josef; Hafele, Walter; and Tschoke, Helmut, to Robert Bosch GmbH. Fuel injection pump for internal combustion engines. 4,708,114, Cl. 123-449.000.

Gupta, Balaram B. G., to Celanese Corporation. Process for producing 2-lower alkyl phenols. 4,709,102, Cl. 568-780.000.

Guscott, John K.; and Vulgaris, George, to ADT, Inc. Steerable mirror assembly and cooperative housing for a passive infrared intrusion detection system. 4,709,151, Cl. 250-342.000.

Guthrie, Walker L. Method of forming corrugated panel. 4,708,757, Cl. 156-163.000.

Gutsche, Gunter E. Method for storing and re-radiating energy to provide propulsion forces on devices. 4,707,979, Cl. 60-203.100.

Haaga, John R. Universal biopsy needle. 4,708,147, Cl. 128-753.000.

Haage, Manfred: *See*—
Richter, Hanno; Mirsberger, Helmut; Uhlig, Raimer; Haage, Manfred; and Uebel, Philipp, 4,708,551, Cl. 411-32.000.

Hack, Robert; and Strzala, Helmut, to Arthur Pfeiffer Vakuumtechnik Wetzlar GmbH. Treating metals and/or metallic compounds. 4,708,190, Cl. 164-76.100.

Hacker, David C.: *See*—
Koenck, Steven E.; and Hacker, David C., 4,709,202, Cl. 320-43.000.

Hackforth G.m.b.H. & Co. KG: *See*—
Walter, Jurgen; Falz, Ulrich; and Lunke, Manfred, 4,708,514, Cl. 403-372.000.

Hackmann, Ludger: *See*—
Sieverding, Werner; Mettenbrink, Herbert; Pohlmann, Gunter; and Hackmann, Ludger, 4,708,267, Cl. 222-211.000.

Hafele, Walter: *See*—
Guntert, Josef; Hafele, Walter; and Tschoke, Helmut, 4,708,114, Cl. 123-449.000.

Hagedorn, Alfred A., III: *See*—
Erhardt, Paul W.; Hagedorn, Alfred A., III; Lumma, William C., Jr.; and Wohl, Ronald A., 4,709,043, Cl. 548-318.000.

Hagelauer, Ulrich; and Faust, Uwe. Process for temperature controlling a liquid. 4,708,878, Cl. 426-231.000.

Haghiri-Tehrani, Yahya; and Hoppe, Joachim, to GAO Gesellschaft fur Automation und Organisation mbH. Carrier element for an IC module. 4,709,254, Cl. 357-72.000.

Halbardier, Floyd A., to Baker Oil Tools, Inc. Method and apparatus for setting, unsetting, and retrieving a packer from a subterranean well. 4,708,208, Cl. 166-387.000.

Haldor Topsoe: *See*—
Grate, John H.; and Hamm, David R., 4,709,073, Cl. 560-24.000.

Haller, Hans, to Brown Boveri Reaktor GmbH. Crash protection apparatus for a device for pulling a tube out of a tube sheet of a heat exchanger. 4,707,912, Cl. 29-726.000.

Halliburton Company: *See*—
Forehand, Gilbert H.; Lynch, Michael J.; Duncan, Richard L.; Tilghman, Stephen E.; and Penn, Jack C., 4,709,234, Cl. 340-856.000.

Hamada, Shuji; and Yamamoto, Akira, to Niigata Engineering Co., Ltd. Method for feeding a work. 4,708,582, Cl. 414-786.000.

Hamamatsu Photonics Kabushiki Kaisha: *See*—
Oba, Koichiro, 4,709,140, Cl. 250-207.000.

Hamamoto, Masaya: *See*—
Maebayashi, Jiro; and Hamamoto, Masaya, 4,708,389, Cl. 296-107.000.

Hambleton, Larry G.; Sears, Claude L.; and Offutt, Elmer B., to Labconco Corporation. Flask washer with vacuum dry. 4,708,153, Cl. 134-170.000.

Hamilton, John R.; and Whigham, Robert H., to Telectronics N.V. Automatic sensitivity control for a pacemaker. 4,708,144, Cl. 128-419.0PG.

Hamilton, Leslie: *See*—
Holewinski, Robert D.; Blatherwick, William J.; Hamilton, Leslie; and Wells, Thomas E., Sr., 4,708,650, Cl. 433-90.000.

Hamilton, Richard J. W., to Titan Manufacturing Co. Pty. Ltd., The. Resistance between nut and bolt. 4,708,550, Cl. 411-3.000.

Hamm, David R.: *See*—
Grate, John H.; and Hamm, David R., 4,709,073, Cl. 560-24.000.

Hammerle AG: *See*—
Hug, Peter, 4,708,573, Cl. 414-589.000.

Hammond, Edward P., to Procter & Gamble Company, The. Apparatus for labeling blow-molded articles by placing label directly on the parison. 4,708,630, Cl. 425-504.000.

Hammond, George S.: *See*—
Masilamani, Divakaran; Hammond, George S.; and Murthy, Andiappan K. S., 4,709,101, Cl. 568-697.000.

Hammond, Ray L.; and Chatham, Thomas B., to Motorola, Inc. Glass repair of hermetic packages. 4,708,889, Cl. 427-140.000.

Hanada, Koji: *See*—
Tanaka, Tsuneo; Yoshitomi, Tetsuro; Hanada, Koji; Ohashi, Mashato; and Hikosaka, Michichika, 4,708,903, Cl. 428-195.000.

Hanada, Yoichiro: *See*—
Hattori, Hisashi; Takenoshita, Hidemitsu; and Hanada, Yoichiro, 4,708,068, Cl. 110-245.000.

Hanagata, Takayoshi, to Canon Kabushiki Kaisha. Ink jet recorder having ink container vent blocking means. 4,709,249, Cl. 346-140.00R.

Hanas, Orest J.; Pennypacker, Frank C.; Radloff, Charles B.; and Schulman, Richard D., to Oak Industries Inc. Satellite scrambling communication network using geographically separated uplinks. 4,709,266, Cl. 380-20.000.

Hand, Elli S.: *See*—
Baker, David C.; Hand, Elli S.; Haugwitz, Rudiger D.; Narayanan, Venkatachala L.; and Rampal, Jang B., 4,709,033, Cl. 544-336.000.

Handlin, Dale L., Jr.: *See*—
Wong, Pui K.; and Handlin, Dale L., Jr., 4,708,990, Cl. 525-250.000.

Hanson, Steven P.: *See*—
Zaruba, John V.; Hanson, Steven P.; and Kuna, Wayne A., 4,708,348, Cl. 273-246.000.

Hansler, Gerd: *See*—
Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Ese, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hansler, Gerd, 4,708,731, Cl. 71-90.000.

Happy Industrial Corporation: *See*—
Takauchi, Mitsuyoshi, 4,708,074, Cl. 112-453.000.

Hara, Seinosuke; Ofuji, Hiromichi; Miisyo, Kazuyuki; Matsumoto, Yasuo; and Kato, Manabu, to Nissan Motor Co., Ltd. Driving apparatus for intake and exhaust valves of internal combustion engine. 4,708,101, Cl. 123-90.160.

Harada, Osamu; Takeda, Yuji; Suematsu, Toshio; Anzai, Katsushi; and Funato, Kazuhiko, to Toyota Jidosha Kabushiki Kaisha. Method of discriminating octane number of fuel for motor vehicle. 4,708,113, Cl. 123-425.000.

Harada, Yoshiharu; Taga, Yutaka; Fukumura, Kagenori; Hayakawa, Yoichi; and Kawai, Masao, to Toyota Jidosha Kabushiki Kaisha; and Aisin-Warner Kabushiki Kaisha. Transmission control device having selectable rotation speed detector. 4,708,032, Cl. 74-866.000.

Harandi, Mohsen N.; Owen, Hartley; and Smyth, Sean C., to Mobil Oil Corporation. Conversion of crude methanol to gasoline with extraction. 4,709,113, Cl. 585-640.000.

Harbor Branch Oceanographic Institution, Inc.: *See*—
Higa, Tatsuo; and Snader, Kenneth M., 4,708,962, Cl. 514-475.000.

Harre, Michael; Kruger, Hans-Rudolf; Arndt, Friedrich; and Rusch, Reinhart, to Schering Aktiengesellschaft. 7-(aryloxy)-2-naphthoxyalkanecarboxylic acid derivatives, processes for the preparation of these compounds, as well as agents having herbicidal activity containing these compounds. 4,709,077, Cl. 560-056.000.

Harris Corporation: *See*—
O'Mara, William E., Jr., 4,708,747, Cl. 437-19.000.
Vu, Thu V., 4,709,345, Cl. 364-746.000.

Harris, Gerald A.; and Schumacher, Thomas W., to Chrysler Motors. Remote adjusting means for a vehicle headlamp. 4,709,306, Cl. 362-68.000.

Harris, Monty E.: *See*—
Sukup, Richard A.; and Harris, Monty E., 4,708,202, Cl. 166-123.000.
Harris, Robert F., to Dow Chemical Company, The. Method of preparing high molecular weight poly(alkylene carbonate) polyahls. 4,709,069, Cl. 558-265.000.
Harris, Robert L. Sharpening stone for use with a sabre or jig saw. 4,707,947, Cl. 51-181.00R.
Harsh, Jack L.: *See*—
Bigler, Mont D.; and Harsh, Jack L., 4,707,997, Cl. 62-341.000.
Hart, LeRoy. Jumping shoe attachment. 4,707,934, Cl. 36-7.800.
Hartgring, Cornelius D.; and Joosten, Johannes J. M., to U.S. Philips Corporation. Semiconductor device comprising a non-volatile storage transistor. 4,709,255, Cl. 357-23.500.
Harthoorn, Carroll L., to Vermeer Manufacturing Co. Method and apparatus for reducing entrapment of a crop material in a round crop baler. 4,707,974, Cl. 56-341.000.
Hartman, George D., to Merck & Co., Inc. 2,6-disubstituted derivatives of 3-nitropyrazines useful as adjuncts to radiation therapy. 4,709,035, Cl. 544-407.000.
Hasco Normalien Hasenclever & Co.: *See*—
Kuhling, Franz, 4,708,314, Cl. 249-103.000.
Hasegawa, Hitoshi: *See*—
Hayashi, Keizo; Hasegawa, Hitoshi; and Suhara, Katsuhiro, 4,708,633, Cl. 425-574.000.
Hasegawa, Toshiharu; Shen, Zai-ming; Muro, Shoujiro; Masuyama, Shigeru; and Toyooka, Akihisa, to Sumitomo Electric Industries, Ltd.; and Hasegawa, Toshiharu. Network priority determining method. 4,709,364, Cl. 370-85.000.
Hashimoto, Kenzaburo, to Fuji Tec Co., Ltd. Drill screw. 4,708,557, Cl. 411-387.000.
Hashimoto, Mitsuru, to Ricoh Co., Ltd. Photosensitive material containing disazo compound for use in electrophotography. 4,708,921, Cl. 430-70.000.
Hashimoto, Osamu: *See*—
Satoh, Susumu; Suzuki, Hideo; Obara, Takashi; Nishida, Minoru; and Hashimoto, Osamu, 4,708,748, Cl. 148-2.000.
Hashimoto, Sadakatsu; and Kamei, Fumio, to Sharp Kabushiki Kaisha. Method for maintaining display/print mode in display printer. 4,709,349, Cl. 364-900.000.
Hashimoto, Shunichi: *See*—
Nagano, Eiki; Yoshida, Ryo; Matsumoto, Hiroshi; Hashimoto, Shunichi; and Kamoshita, Katsuzo, 4,709,049, Cl. 548-513.000.
Hashizume, Masatora; Kudoh, Eiichi; Fujiwara, Setuzo; and Shiomi, Hitomi, to Kanebo Bell-Touch, Ltd. Fabric fastener. 4,707,893, Cl. 24-446.000.
Haskel, Inc.: *See*—
Vossbrinck, William J. H., 4,708,036, Cl. 81-57.380.
Hasui, Hiroshi: *See*—
Ishikuma, Mineyasu; Hasui, Hiroshi; and Ono, Toshiyuki, 4,708,881, Cl. 426-524.000.
Hata, Kanji; Itemadani, Eiji; and Maruyama, Masahiro, to Matsushita Electric Industrial Co., Ltd. Moving table type work system. 4,708,232, Cl. 198-346.100.
Hata, Koichi, to Honda Giken Kogyo Kabushiki Kaisha. Mechanism for limiting angular movement in steering systems for motor vehicles. 4,708,363, Cl. 280-771.000.
Hatamura, Kouichi; Hiraoka, Tetsuo; Hokazono, Kazuaki; and Seike, Shinji, to Mazda Motor Corporation. Induction system for V-type internal combustion engine. 4,708,097, Cl. 123-52.00M.
Hatanaka, Kaoru: *See*—
Yamashita, Akihiko; Ikegami, Masahiko; and Hatanaka, Kaoru, 4,709,123, Cl. 174-52.00R.
Hatfield, James C., to Union Carbide Corporation. Encapsulation of phase change materials. 4,708,812, Cl. 252-70.000.
Hatori, Mitsuo: *See*—
Hayano, Makoto; Nagatomo, Shigemi; Sakata, Hirotsugu; Hatori, Mitsuo; and Hattori, Hitoshi, 4,708,607, Cl. 418-55.000.
Hattori, Hisashi; Takenoshita, Hidemitsu; and Hanada, Yoichiro, to Kabushiki Kaisha Komatsu Seisakusho. Fluidized-bed incineration equipment for removing organic substances. 4,708,068, Cl. 110-245.000.
Hattori, Hitoshi: *See*—
Hayano, Makoto; Nagatomo, Shigemi; Sakata, Hirotsugu; Hatori, Mitsuo; and Hattori, Hitoshi, 4,708,607, Cl. 418-55.000.
Hattori, Yoshiyuki: *See*—
Takagi, Kozi; Nomura, Ken; Hattori, Yoshiyuki; and Kamiya, Masahiko, 4,708,406, Cl. 303-115.000.
Haugwitz, Rudiger D.: *See*—
Baker, David C.; Hand, Elli S.; Hsugwitz, Rudiger D.; Narayanan, Venkatachala L.; and Rampal, Jang B., 4,709,033, Cl. 544-336.000.
Hauk, Rolf; and Kepplinger, Werner, to Voest-Alpine Akt.; and Korf Engineering GmbH. Method of producing molten pig iron or steel pre-products from particulate ferrous material. 4,708,736, Cl. 75-26.000.
Hautmann, Horst: *See*—
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Havrevold, Sveinung B.: *See*—
Molaug, Ole; Havrevold, Sveinung B.; and Skjeveland, Odd, 4,708,090, Cl. 119-51.00R.
Hawkeye Concrete Products Co.: *See*—
Schmidgall, Hartzell H.; and Schmidgall, Jon A., 4,708,621, Cl. 425-183.000.
Hayakawa, Mitsuru, to Victor Company of Japan, Ltd. Limiter circuit. 4,709,204, Cl. 323-303.000.
Hayakawa, Yoichi: *See*—
Harada, Yoshiharu; Taga, Yutaka; Fukumura, Kagenori; Hayakawa, Yoichi; and Kawai, Masao, 4,708,032, Cl. 74-866.000.
Hayano, Makoto; Nagatomo, Shigemi; Sakata, Hirotsugu; Hatori, Mitsuo; and Hattori, Hitoshi, to Kabushiki Kaisha Toshiba. Scroll compressor with lower and higher pressure chambers acting on the orbiting end plate. 4,708,607, Cl. 418-55.000.
Hayase, Masashi: *See*—
Yasui, Ken K.; Williams, Neil R.; Ecklund, Richard C.; Hayase, Masashi; and Walkington, Robert J., 4,708,008, Cl. 72-60.000.
Hayashi, Keizo; Hasegawa, Hitoshi; and Suhara, Katsuhiro, to Toyoda Gosei Co., Ltd. Injection molding machine. 4,708,633, Cl. 425-574.000.
Hayashi, Masahiro: *See*—
Ogo, Kazutaka; Hayashi, Masahiro; Suzuki, Takatoshi; Hokao, Katsuiku; Asai, Akio; and Tsuruhashi, Takayuki, 4,709,198, Cl. 318-571.000.
Hayashi, Yoshiharu; and Misumi, Teruyuki, to Asahi Kasei Kogyo Kabushiki Kaisha. 5-(2-chloro-4-trifluoromethylphenoxy)-2-nitro-α-substituted-acetophenone, oxime derivative thereof, herbicidal composition, and method for the destruction of undesirable weeds. 4,708,734, Cl. 71-100.000.
Hayes, Leonard L.: *See*—
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Hazeltine Corporation: *See*—
Spieth, Robert H.; and DeLorenzo, Anthony N., 4,709,262, Cl. 358-74.000.
Health and Human Services: *See*—
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435-5.000.
Hecker, Mark B., to Data General Corporation. Input/output device controller for a data processing system. 4,709,329, Cl. 364-200.000.
Heckman, Glenard W., to Little Giant Crane and Shovel, Inc. Combination rail and highway vehicle. 4,708,066, Cl. 105-215.200.
Hehl, Karl. Injection molding unit. 4,708,622, Cl. 425-185.000.
Hehl, Karl. Injection unit for injection molding machine. 4,708,631, Cl. 425-542.000.
Hehn, Wilfried: *See*—
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Heidelberger Druckmaschinen AG: *See*—
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Heidemann, Wolfgang, to Mannesmann AG. Brick-lining a metallurgical vessel. 4,708,328, Cl. 266-281.000.
Heikkila, Risto M.: *See*—
Honkaniemi, Matti E.; Mustikka, Lauri A.; Jankkila, Martti J.; Hokkanen, Pentti O.; Heikkila, Risto M.; and Lilja, Launo L., 4,708,640, Cl. 432-14.000.
Heil Co., The: *See*—
Smith, Fred T.; and Smith, Fred P., 4,708,570, Cl. 414-408.000.
Heimbigner, Thomas; and Tsui, Gary, to CBC Industries, Inc. Wire lock liner. 4,708,540, Cl. 408-72.00B.
Hein, Lehmann AG: *See*—
Schmidt, Gerhard; Neukam, Christian; and Schmidt, Heinrich, 4,708,795, Cl. 210-304.000.
Heinisch, Richard V.; and Lewin, Ian, to Ruud Lighting, Inc. Floodlight with improved reflector system. 4,709,312, Cl. 362-298.000.
Heitmeier, Rolf: *See*—
Rath, Dieter; and Heitmeier, Rolf, 4,708,802, Cl. 210-641.000.
Heja, Gergely; Korbonits, Dezso; Palosi, Endre; Kiss, Pal; Gonczi, Csaba; Szvoboda nee Kanzel, Ida; Marvanyos, Ede; Kun, Judit; Szomor nee Wundele, Maria; Szabo, Gabor; Kallay, Tamas; and Ledniczky, Laszlo, to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara R.T. Process for the preparation of diphenyl ether derivatives. 4,709,081, Cl. 560-100.000.
Helbling, Clements A., Jr.; and Steinberg, Robert M., to Texaco Inc. Uniform flow distributing means for a trickle bed flow reactor. 4,708,852, Cl. 422-220.000.
Helix Technology Corporation: *See*—
Lessard, Philip A.; and Smith, Marshall J., 4,708,165, Cl. 137-509.000.
Heilekson, Ronald A.; and Peterson, Donald S., to Spectra-Physics, Inc. Bar code scanner with DC brushless motor. 4,709,195, Cl. 318-254.000.
Hellnick, Dieter; Victor, Karl J.; and Otten, Gregory K. Method for machining and improved modified threaded collar. 4,708,038, Cl. 82-1.00C.
Hellstrom, Lars, to Optimed N.V. Method for manufacturing a spectacle-glass for myopes. 4,707,949, Cl. 51-284.00R.
Helmich, Melvin J.; Ryan, William P.; and Marvin, David H., to Cooper Industries. Fuel control system for dual fuel engines. 4,708,094, Cl. 123-27.0GE.
Henderson, Daniel R., to Microgenics Corporation. Methods for protein binding enzyme complementation assays. 4,708,929, Cl. 435-7.000.
Henderson, Earl E.: *See*—
Suhadolnik, Robert J.; Wu, Joseph M.; Doetsch, Paul; and Henderson, Earl E., 4,708,935, Cl. 435-91.000.
Henderson, Edwin L. Photoelectric bin level sensor and method of installing the same. 4,709,143, Cl. 250-222.100.
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Nestlen, Wolfgang; and Rudolf, Reiner, 4,709,219, Cl. 335-129.000.
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Cabado, Ramon B., 4,708,744, Cl. 106-14.120.
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Henne, Werner: *See*—
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Hercules Incorporated: *See*—
Leach, Douglas R., 4,708,969, Cl. 521-82.000.
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Faulstich, Ingo; and Ulbrich, Dieter, 4,708,544, Cl. 409-12.000.
Hermolin, Joshua; and Kampf, Arieh, to Bromine Compounds Ltd. Process for the manufacture of mixtures of 3-phenoxybenzyl bromide and 3-phenoxybenzal bromide. 4,709,100, Cl. 568-639.000.
Herrick, David L., to Sanders Associates, Inc. Dipatch antenna. 4,709,239, Cl. 343-700.0MS.
Herrington, Fox J., to Mobil Oil Corporation. Screw extruder with a rotatable barrel section. 4,708,617, Cl. 425-135.000.
Hernring, Gunther, to Montblanc-Simplo GmbH. Ink supply system with tube pump. 4,708,506, Cl. 401-151.000.
Hessel, Lasse. Resilient supporting device. 4,707,872, Cl. 5-451.000.
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Hewgill, Gregory S.: *See*—
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Hibberd, Carl G. Paint roller cleaner apparatus. 4,708,152, Cl. 134-138.000.
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Higa, Tatsuo; and Snader, Kenneth M., to Harbor Branch Oceanographic Institution, Inc. Antiviral and antitumor cyclohexadienone compositions. 4,708,962, Cl. 514-475.000.
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Higgs, Jacob K., to Sprague Electric Company. Integrated Hall element and amplifier with controlled offset voltage. 4,709,214, Cl. 330-6.000.
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Himes, John L., Jr.; McCleerey, Earl W.; and Reynolds, Charles E., to AMP Incorporated. Electrical connector having low inductance shield. 4,708,412, Cl. 439-95.000.
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Iizuka, Kenichi; Kitayama, Tooru; Uzuhashi, Hideo; and Aoki, Hideo, 4,709,317, Cl. 363-37.000.
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Komeyama, Yoshihiro; Kembo, Yukio; Kuni, Asahiro; Funatsu, Ryuuichi; Inagaki, Akira; Ikeda, Minoru; and Okamoto, Keiichi, 4,708,484, Cl. 356-401.000.
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Mizumoto, Muneo; Inouye, Hiroshi; and Kitsunai, Hiroyuki, 4,708,350, Cl. 277-80.000.
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Hodges, Virgil D. Self adjusting belt tightening tool. 4,708,320, Cl. 254-129.000.
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Schoen, Klaus-Peter, 4,708,452, Cl. 354-317.000.
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Hoechst Gosei Kabushiki Kaisha: *See*—
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Holm, Timothy R. Microwave radiating antennae hydraulic adjustment apparatus and method. 4,707,992, Cl. 60-721.000.
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Humber, Leslie G.: *See—*
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Humer, Franz X. Extrusion apparatus for manufacturing foil out of plastic. 4,708,616, Cl. 425-133.500.

Hung, Francis Y.; and Livermore, Frederick C., to Northern Telecom Limited. Protection arrangement for a telephone subscriber line interface circuit. 4,709,296, Cl. 361-102.000.

Hunt, Carl E.: *See—*
Plutschuck, Lawrence; and Hunt, Carl E., 4,708,543, Cl. 408-151.000.

Hunt, Christopher J.: *See—*
Everett, Geoffrey J.; and Hunt, Christopher J., 4,708,121, Cl. 123-643.000.

Hunting, Ronald M., to Aeroquip Corporation. Contractible coupling. 4,708,377, Cl. 285-407.000.

Huppmann, Winfried, to Sintermetallwerk Krebsoege GmgH. Sintered metal body with at least one toothing. 4,708,912, Cl. 428-547.000.

Husain, Abbas. Self-contained portable apparatus for blood typing. 4,708,850, Cl. 422-61.000.

Hussein, Mamoun M., to Nabisco Brands, Inc. Essential oils treated to remove harsh notes therefrom. 4,708,880, Cl. 426-424.000.

Hutmacher, Hans-Martin: *See—*
Merger, Franz; Hutmacher, Hans-Martin; Hettinger, Peter; Voges, Dieter; and Lengsfeld, Wolfgang, 4,709,072, Cl. 558-450.000.

Hwang, William: *See—*
McClanahan, Robert F.; Washburn, Robert; and Hwang, William, 4,709,215, Cl. 330-43.000.

Hydril Company: *See—*
Roche, Joseph R.; and Lin, Shaw-Wen, 4,708,513, Cl. 403-361.000.

Hydro-Horse, Inc.: *See—*
Kime, James A., 4,707,993, Cl. 60-372.000.

Hydro Mecanique Research S.A.: *See—*
Nijenhuis, Harry, 4,708,569, Cl. 414-332.000.

Hymmen, Karl: *See—*
Abildgaard, William H.; and Hymmen, Karl, 4,708,560, Cl. 412-7.000.

Hynecek, Jaroslav, to Texas Instruments Incorporated. Hydrogen iodide etch of tin oxide. 4,708,766, Cl. 156-643.000.

I.F.W.-Industrie-Formen und Werkzeugbau-Manfred Otte Gesellschaft m.b.H. & Co. KG.: *See—*
Mittereggler, Erich; and Schwaiger, Ernst, 4,708,632, Cl. 425-556.000.

Ibach, Harald: *See—*
Boden, Karl; Ibach, Harald; and Linke, Udo, 4,708,764, Cl. 156-617.00R.

Ichihara, Takayuki: *See—*
Yogo, Takeji; Nakagaki, Akitsuna; Miyazawa, Akio; Mitomo, Takeshi; and Ichihara, Takayuki, 4,708,199, Cl. 165-167.000.

Ichikawa, Toshiji; Takahara, Kazuaki; Shimoda, Kazuhiro; Seita, Yukio; and Emi, Makoto, to Terumo Kabushiki Kaisha. Hollow fiber membrane and method for manufacture thereof. 4,708,800, Cl. 210-500.230.

Ichinose, Katsuki; and Shinohara, Hirofumi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device. 4,709,354, Cl. 365-226.000.

Ichiryuu, Taku: *See—*
Katayama, Kazuso; Ichiryuu, Taku; Mouri, Yasushi; Mitsuhashi, Tsuneyoshi; and Kobayashi, Masanori, 4,708,587, Cl. 415-104.000.

Ichise, Eiji: *See—*
Nakamura, Hajime; Iwase, Masanori; Ichise, Eiji; Moriya, Takaharu; and Maruhashi, Shigeaki, 4,708,783, Cl. 204-423.000.

ICI Americas Inc.: *See—*
Nelson, Richard V.; and Stephen, John F., 4,709,063, Cl. 549-561.000.

Ienaga, Kazuharu; Nakamura, Ko; and Ishii, Akira, to Nippon Zoki Pharmaceutical Co., Ltd. Hypoglycemic oxaluric acid derivatives. 4,708,954, Cl. 514-183.000.

Ienaga, Kazuharu; and Nakamura, Ko. Acylindole derivatives and their use in pharmaceutical compositions. 4,708,961, Cl. 514-423.000.

Igarashi, Osamu: *See—*
Kugo, Masaru; Ouchi, Hideyuki; Katogi, Kouzou; Igarashi, Osamu; Suda, Seiji; Tokuyama, Keiichi; and Yamamura, Hirohisa, 4,708,440, Cl. 350-339.00F.

Iguchi, Masashi: *See—*
Sawada, Tadashi; Ikegami, Tatsuji; and Iguchi, Masashi, 4,708,586, Cl. 415-72.000.

Ihana, Toshio: *See—*
Inoue, Kazuhiko; Kawasaki, Tsutomu; and Ihana, Toshio, 4,709,281, Cl. 360-97.000.

Iimori, Takamasa: *See—*
Shibasaki, Masakatsu; and Iimori, Takamasa, 4,709,064, Cl. 556-418.000.

Iimura, Seiji; Abe, Yoshio; Okumura, Jun; Naito, Takayuki; and Kamachi, Hajime, to Bristol-Myers Company. 3-(substituted)propenyl-7-aminothiazol-ylcephalosporanic acids and esters thereof. 4,708,955, Cl. 514-202.000.

Iio, Shigeyoshi: *See—*
Nishibayashi, Hideyuki; Iio, Shigeyoshi; Watanabe, Fumio; and Goto, Takakiyo, 4,709,090, Cl. 562-537.000.

Iizuka, Kenichi; Kitayama, Tooru; Uzuhashi, Hideo; and Aoki, Hideo, to Hitachi, Ltd. Inverting apparatus. 4,709,317, Cl. 363-37.000.

Ikeda Bussan Co., Ltd.: *See—*
Yamano, Eiiti; and Yamauchi, Yoshihiko, 4,708,387, Cl. 296-63.000.

Ikeda, Minoru: *See—*
Komeyama, Yoshihiro; Kembo, Yukio; Kuni, Asahiro; Funatsu, Ryuuichi; Inagaki, Akira; Ikeda, Minoru; and Okamoto, Keiichi, 4,708,484, Cl. 356-401.000.

Ikegami, Masahiko: *See—*
Yamashita, Akihiko; Ikegami, Masahiko; and Hatanaka, Kaoru, 4,709,123, Cl. 174-52.00R.

Ikegami, Tatsuji: *See—*
Sawada, Tadashi; Ikegami, Tatsuji; and Iguchi, Masashi, 4,708,586, Cl. 415-72.000.

Ikegami Tsushinki Co., Ltd.: *See—*
Akimoto, Taizo; and Kawai, Masahiko, 4,709,268, Cl. 358-150.000.

Ikematsu, Hideaki; and Kawamoto, Masako. Sanitary urine collecting apparatus. 4,707,864, Cl. 4-144.300.

Ikemoto, Kazuhito, to Toyota Jidosha Kabushiki Kaisha. Power transmission with ancillary change-speed mechanism for extra-low-speed gear train. 4,708,026, Cl. 74-359.000.

Ikenaga, Shinichi: *See—*
Nakagome, Yoshinobu; Aoki, Masakazu; Horiguchi, Masashi; Shimohigashi, Katsuhiro; and Ikenaga, Shinichi, 4,709,350, Cl. 365-45.000.

Ikeno, Hitoshi: *See—*
Moritani, Nakanobu; Sugita, Mitsuyuki; Hoshino, Isamu; Yanagi, Hirofumi; Ikeno, Hitoshi; and Konno, Tetsuro, 4,709,218, Cl. 331-116.0FE.

Iketani, Kohichi: *See—*
Tanimoto, Yoshio; and Iketani, Kohichi, 4,708,992, Cl. 525-313.000.

Ikimi, Kiyoshi: *See—*
Sato, Hiroshi; Ikimi, Kiyoshi; Tojima, Hideto; and Takahashi, Mikoto, 4,709,112, Cl. 585-513.000.

Ikushima, Koichiro: *See—*
Utsumi, Shigeo; Kanesaki, Tateo; Kagiyama, Takashi; Otonari, Satoshi; Ikushima, Koichiro; and Okumura, Norio, 4,708,902, Cl. 428-141.000.

Ikuzaki, Kunihiko: *See—*
Shimohigashi, Katsuhiro; Masuda, Hiroo; Ikuzaki, Kunihiko; and Kawamoto, Hiroshi, 4,709,353, Cl. 365-205.000.

Ikuzawa, Masanori: *See—*
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,708,950, Cl. 514-42.000.

Illinois Tool Works Inc.: *See—*
Boeckmann, Hugo; Huff, Glenn E.; and Tilman, Paul A., 4,708,245, Cl. 206-330.000.

Illy, Ernesto, to Illycaffe S.p.A. Apparatus for monitoring a stream of comminuted solid material. 4,708,485, Cl. 356-440.000.

Illycaffe S.p.A.: *See—*
Illy, Ernesto, 4,708,485, Cl. 356-440.000.

Imai, Isamu; Oshima, Kazuo; Tanaka, Kenichi; and Inada, Norio, to Bridgestone Tire Company Limited. Pneumatic radial tire. 4,708,185, Cl. 152-451.000.

Imaizumi, Masaki: *See—*
Fujii, Toru; Takase, Hiroshi; and Imaizumi, Masaki, 4,708,442, Cl. 350-422.000.

Imi-Tech Corporation: *See—*
Long, John V.; and Gagliani, John, 4,708,972, Cl. 521-185.000.

Imperial Chemical Industries PLC: *See—*
Kay, Ian T.; and Noon, Robert A., 4,709,038, Cl. 546-316.000.
Ryan, Timothy G., 4,708,976, Cl. 523-300.000.

Inada, Norio: *See—*
Imai, Isamu; Oshima, Kazuo; Tanaka, Kenichi; and Inada, Norio, 4,708,185, Cl. 152-451.000.

Inagaki, Akira: *See—*
Komeyama, Yoshihiro; Kembo, Yukio; Kuni, Asahiro; Funatsu, Ryuuichi; Inagaki, Akira; Ikeda, Minoru; and Okamoto, Keiichi, 4,708,484, Cl. 356-401.000.

Inagaki, Hiroshi; Miyamoto, Takeaki; Ito, Hiraku; and Shibata, Tohru, to Daicel Chemical Industries Ltd. Anticoagulative high-molecular compositions. 4,708,951, Cl. 514-57.000.

Inagaki, Junichi: *See*—
Yamaura, Mitsuru; Inagaki, Junichi; and Ito, Hachidai, 4,709,295, Cl. 361-80.000.

Inai, Yuichi: *See*—
Yamatsu, Isao; Abe, Shinya; Inai, Yuichi; Suzuki, Takeshi; Kinoshita, Kensaku; Mishima, Mannen; Katoh, Yoshinori; Kobayashi, Seiichi; Murakami, Manabu; and Yamada, Kouzi, 4,709,079, Cl. 560-66.000.

Inazuma, Sunao: *See*—
Matsumoto, Tadao; and Inazuma, Sunao, 4,708,055, Cl. 99-484.000.

Indoor Archery International Corporation: *See*—
Paraskevakos, Theodore G., 4,708,341, Cl. 272-135.000.

Industrial Innovations, Inc.: *See*—
Urbani, William G., 4,707,878, Cl. 15-302.000.

Industrial Technology Research Institute: *See*—
Luo, Jih-Tzang, 4,708,100, Cl. 123-73.0PP.
Shyu, Jia-Ming, 4,708,337, Cl. 272-69.000.

Industrie Pirelli S.p.A.: *See*—
Robecchi, Edoardo; and Dell'Orto, Renato, 4,708,702, Cl. 474-261.000.

Ingendoh, Axel; Meyer, Horst; and Garthoff, Bernward, to Bayer Aktiengesellschaft. Imidazothiadiazolealkylene carboxylic acids. 4,709,031, Cl. 544-333.000.

Ingenhoven, Jurgen, to Kiekert GmbH & Co. Kommanditgesellschaft. Electrically controlled central locking device for automobile doors. 4,708,378, Cl. 292-201.000.

Ingersoll-Rand Company: *See*—
Krasnoff, Eugene L., 4,707,952, Cl. 51-410.000.

Ingram, Alvin R.; and Di Giulio, Adolph V., to Atlantic Richfield Company. Divinylbenzene in expandable beads for cup molding. 4,708,968, Cl. 521-60.000.

Inhofe, James A., Jr.; and Evans, Harold J., to Central Plastics Company. Plastic pile protector and method of covering a pile with same. 4,708,527, Cl. 405-216.000.

Inohara, Kazumi: *See*—
Sakata, Isao; Nakajima, Susumu; Koshimuzi, Koichi; Samejima, Natsuki; Inohara, Kazumi; and Takata, Hiroyuki, 4,709,022, Cl. 540-145.000.

Inomata, Yoshihisa: *See*—
Shimizu, Isoo; Matsumura, Yasuo; and Inomata, Yoshihisa, 4,709,089, Cl. 562-494.000.

Inoue, Kazuhiko; Kawasaki, Tsutomu; and Ihana, Toshio, to Teac Corporation. Data transfer apparatus for use with a magnetic disk cartridge. 4,709,281, Cl. 360-97.000.

Inoue, Noboru; and Miura, Yoshio, to Takasago Medical Industry Co., Ltd. Soluble suturing device for an intestine. 4,708,141, Cl. 128-334.00R.

Inoue, Satoshi: *See*—
Narisoko, Minoru; and Inoue, Satoshi, 4,708,067, Cl. 110-245.000.

Inoue, Youichi: *See*—
Asari, Akira; and Inoue, Youichi, 4,708,627, Cl. 425-405.00H.

Inouye, Hiroshi: *See*—
Mizumoto, Muneo; Inouye, Hiroshi; and Kitsunai, Hiroyuki, 4,708,350, Cl. 277-80.000.

Instance, David J. Label. 4,708,368, Cl. 283-81.000.

Institut de Recherches de la Siderurgie Francaise—IRSID: *See*—
Georges, Philippe, 4,708,325, Cl. 266-90.000.

Institut Francais du Petrole: *See*—
Berthet, Hubert; and Laugier, Noel, 4,708,526, Cl. 405-202.000.

Institut Gornogo Dela So An SSSR: *See*—
Shemyakin, Evgeny I.; Kamensky, Veniamin V.; Kostylev, Alexandr D.; Sudnishnikov, Boris V.; Tupitsya, Sergei K.; Tupitsyn, Konstantin K.; Plavskikh, Vladimir D.; and Chepurnoi, Nikolai P., 4,708,211, Cl. 175-19.000.

Institut Pasteur: *See*—
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435-5.000.

Institut PO Technitcheska Kibernetike I Robotika: *See*—
Ivanov, Rossen V., 4,707,907, Cl. 29-525.000.

Institute for Applied Biotechnology, The: *See*—
Branemark, Per-Ingvar, 4,708,654, Cl. 433-213.000.

Institute of Technology Precision Electrical Discharge Works: *See*—
Ozaki, Sei; and Futamura, Shoji, 4,707,904, Cl. 29-445.000.

Intardonato, Alfred J. Table tray. 4,708,256, Cl. 220-23.400.

Interez, Inc.: *See*—
Shimp, David A., 4,709,008, Cl. 528-422.000.

Intermedicat GmbH: *See*—
Rath, Dieter; and Heitmeier, Rolf, 4,708,802, Cl. 210-641.000.

International Business Machines Corporation: *See*—
Anthony, Bruce O., Jr.; Batalden, Glenn D.; Mitchell, Glen R.; Schloss, Phillip C.; and Wells, David K., 4,709,328, Cl. 364-200.000.
Ashton, Gerard J.; Cavaliere, Joseph R.; and Cheng, Ming T., 4,709,169, Cl. 307-455.000.
Banker, Dennis C.; Dorler, Jack A.; and Hryckowian, John N., 4,709,166, Cl. 307-441.000.
Braceras, George M.; and Dreibelbis, Jeffrey H., 4,709,162, Cl. 307-270.000.
Deringer, Thomas J., 4,708,383, Cl. 294-86.400.
Grafe, Robert J.; and Pancoast, Steven T., 4,709,367, Cl. 371-38.000.
Horn, Gary R.; and Mikelait, Robert C., 4,709,348, Cl. 364-900.000.
Hovel, Harold J.; and Kuech, Thomas F., 4,708,883, Cl. 427-38.000.
Robinson, John T., 4,709,326, Cl. 364-200.000.

International Fuel Cells Corporation: *See*—
Swarr, Thomas E.; and Trocciola, John C., 4,708,917, Cl. 429-40.000.

International Minerals & Chemical Corp.: *See*—
Eckler, Paul E., 4,709,104, Cl. 568-853.000.

International Paper Box Machine Co.: *See*—
Labombarde, Raymond A.; and Tremblay, Robert A., 4,707,970, Cl. 53-529.000.

International Paper Company: *See*—
Fries, Carl J., Jr., 4,708,708, Cl. 493-357.000.

Intevep, S.A.: *See*—
Fekete, Ammon V., 4,708,597, Cl. 417-259.000.

Inui, Toshiharu: *See*—
Takahashi, Haruhiko; Inui, Toshiharu; Saitoh, Hiroyuki; Ishikawa, Noriyoshi; Funato, Hitoshi; Ohmori, Takashi; Kurata, Masami; and Katou, Yasuo, 4,709,149, Cl. 250-317.100.

Inventio AG: *See*—
Schrooder, Joris, 4,708,224, Cl. 187-122.000.

Inverni Della Beffa SpA: *See*—
Bombardelli, Ezio; Gabetta, Bruno; and Conti, Marisa, 4,709,076, Cl. 560-55.000.

IPCO Corporation: *See*—
Weissman, Bernard, 4,708,648, Cl. 433-49.000.

Irani, Andrew A.; Schulte-Ladbeck, Bernd H.; and Arani, Aspee A., to Polsun Manufacturing Corporation. Bag handle. 4,707,883, Cl. 16-110.00R.

Iscar Ltd.: *See*—
Elka, Shmuel; and Satran, Amir, 4,708,537, Cl. 407-46.000.

Isco, Inc.: *See*—
Allington, Robert W., 4,709,190, Cl. 315-307.000.

Ishida Scales Manufacturing Company, Ltd.: *See*—
Nakamura, Toru; Konishi, Satoshi; Yamada, Seiji; Tatsuoka, Masahiko; and Kubo, Michihiro, 4,708,215, Cl. 177-25.000.

Ishida, Tomoyuki: *See*—
Nakamura, Akira; Oinoue, Hiroshi; Ishida, Tomoyuki; and Shintani, Kenji, 4,709,139, Cl. 250-201.000.

Ishihara, Koushi: *See*—
Kakii, Toshiaki; Matsuno, Koichiro; Suzuki, Shuzo; Ashiya, Fumihiro; and Ishihara, Koushi, 4,708,433, Cl. 350-96.220.

Ishii, Akira: *See*—
Ienaga, Kazuharu; Nakamura, Ko; and Ishii, Akira, 4,708,954, Cl. 514-183.000.

Ishii, Kenjiro: *See*—
Otsuki, Hajime; Ishii, Kenjiro; Satoh, Yutaka; and Fukumoto, Fumio, 4,708,464, Cl. 355-45.000.

Ishii, Norio: *See*—
Sato, Hiroshi; Hirose, Kenichi; Ishii, Norio; and Umada, Youichi, 4,709,024, Cl. 540-536.000.

Ishii, Shinichi: *See*—
Someno, Tetsuya; Kato, Kazuo; Takahashi, Yasushi; Ishii, Shinichi; Takeuchi, Tomio; and Umezawa, Hamao, 4,708,944, Cl. 502-7.000.

Ishii, Yutaka; Nakagawa, Kenichi; and Funada, Fumiaki, to Sharp Kabushiki Kaisha. Liquid crystal display device with prism for viewing. 4,708,439, Cl. 350-331.00R.

Ishikawa, Noriyoshi: *See*—
Takahashi, Haruhiko; Inui, Toshiharu; Saitoh, Hiroyuki; Ishikawa, Noriyoshi; Funato, Hitoshi; Ohmori, Takashi; Kurata, Masami; and Katou, Yasuo, 4,709,149, Cl. 250-317.100.

Ishikawa, Tadashi: *See*—
Takahashi, Kazuyoshi; Suzuki, Koji; Nagahira, Joji; Yoshihara, Kunio; Matsui, Toshiro; and Ishikawa, Tadashi, 4,709,319, Cl. 363-49.000.

Ishikawajima-Harima Heavy Industries Co., Ltd.: *See*—
Narisoko, Minoru; and Inoue, Satoshi, 4,708,067, Cl. 110-245.000.

Ishikuma, Mineyasu; Hasui, Hiroshi; and Ono, Toshiyuki, to Ajinomoto Co., Inc. Method for producing frozen foods. 4,708,881, Cl. 426-524.000.

Isobe, Yukihiro: *See*—
Ohtsuki, Akira; Konno, Ryozo; Kanno, Nobumori; Sugai, Makio; Mihoya, Takashi; Kubota, Yuichi; Nishimatsu, Masaharu; Isobe, Yukihiro; Tanaka, Kazushi; and Shinoura, Osamu, 4,708,909, Cl. 428-425.900.

Isohata, Junji; Yamamoto, Hironori; and Matsushita, Koichi, to Canon Kabushiki Kaisha. Exposure apparatus. 4,708,465, Cl. 355-53.000.

Isohata, Junji; and Miyazaki, Makoto, to Canon Kabushiki Kaisha. Exposure apparatus. 4,708,466, Cl. 355-53.000.

Isozaki, Takashi: *See*—
Yokoi, Shigeo; Isozaki, Takashi; Yamamoto, Ryuta; and Kawaguchi, Toshiyuki, 4,709,330, Cl. 364-400.000.

Itakura, Tetsuro; Kasagi, Yoshitaka; Koyama, Mikio; and Nakagawara, Chikashi, to Kabushiki Kaisha Toshiba. Phased lock loop synchronous detecting system with an automatic frequency tuning circuit. 4,709,408, Cl. 455-260.000.

Itemadani, Eiji: *See*—
Hata, Kanji; Itemadani, Eiji; and Maruyama, Masahiro, 4,708,232, Cl. 198-346.100.

Ito, Hachidai: *See*—
Yamaura, Mitsuru; Inagaki, Junichi; and Ito, Hachidai, 4,709,295, Cl. 361-80.000.

Ito, Hajime; and Miwa, Junichi, to Toyo Cloth Co., Ltd. Method for manufacturing polishing cloths. 4,708,891, Cl. 427-245.000.

Ito, Hiraku: *See*—
Inagaki, Hiroshi; Miyamoto, Takeaki; Ito, Hiraku; and Shibata, Tohru, 4,708,951, Cl. 514-57.000.

Itoh, Minoru, to Matsushita Electronics Corporation. Bucket brigade charge transfer device with auxiliary gate electrode. 4,709,380, Cl. 377-58.000.

ITT Electro Optical Products, a division of ITT Corporation: *See*—
Blank, Richard E.; Tien, Albert F.; and Amith, Avraham, 4,708,677, Cl. 445-3.000.

ITT Gallium Arsenide Technology Center, a division of ITT Corporation: *See*—
Landis, Richard C., 4,709,300, Cl. 361-398.000.

Ivanov, Rossen V., to Institut PO Technitcheska Kibernetike I Robotika. Method for scanning fitting of two pieces, one going into the other. 4,707,907, Cl. 29-525.000.

Iveco Magirus AG: *See*—
Pechar, Franz, 4,708,184, Cl. 152-417.000.

Iwai, Hiroji: *See*—
Tsumura, Takeo; Iwai, Hiroji; and Kadoya, Atsushi, 4,708,505, Cl. 400-697.100.

Iwamoto, Taro: *See*—
Hosoda, Yuji; Honma, Kazuo; Fujie, Masakatsu; Iwamoto, Taro; Kamejima, Kohji; and Nakano, Yoshiyuki, 4,709,342, Cl. 364-558.000.

Iwanaga, Yukiya: *See*—
Yokoyama, Hitoshi; and Iwanaga, Yukiya, 4,708,876, Cl. 426-33.000.

Iwasaki, Tetsuo: *See*—
Kawabe, Ryoichi; Iwasaki, Tetsuo; Kozuru, Hiroshi; Yoda, Masashi; Matsunaga, Masakazu; Takamori, Takesi; and Nakasima, Matao, 4,707,867, Cl. 4-313.000.

Iwase, Masanori: *See*—
Nakamura, Hajime; Iwase, Masanori; Ichise, Eiji; Moriya, Takaharu; and Maruhashi, Shigeaki, 4,708,783, Cl. 204-423.000.

Iwata, Hiroshi: *See*—
Fujiwara, Haruyoshi; Makino, Tetsuo; and Iwata, Hiroshi, 4,708,773, Cl. 162-300.000.

Iwata, Kenneth K.; Fryling, Charlotte M.; and Todaro, George J., to United States of America, Health and Human Services. Substantially purified tumor growth inhibitory factor. 4,708,948, Cl. 514-2.000.

J. A. Baldwin Manufacturing Co.: *See*—
Cudaback, Roger L., 4,708,171, Cl. 137-588.000.

J.M. Voith GmbH: *See*—
Bronowski, Helmut; and Dahlke, Christian, 4,708,590, Cl. 415-219.00C.
Musselmann, Walter, 4,708,295, Cl. 241-46.170.

Jablonkai, Istvan: *See*—
Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Nagy, Mihaly; and Backkai, Gyorgy, 4,708,733, Cl. 71-94.000.

Jackel, Lothar: *See*—
Bathelt, Heinrich; Ehrl, Winfried; Wehowsky, Frank; Kleber, Rolf; Lotz, Werner; Gienz, Wolfgang; Herdt, Hubert; Jackel, Lothar; Mast, Jan-Hilbert; Hintermeier, Karl; and Muller, Manfred, 4,709,074, Cl. 560-33.000.

Jackson, D. Keith: *See*—
McGregor, Ian R.; Jackson, D. Keith; Brown, Walter F. M.; and Burrell, Kenneth, 4,708,775, Cl. 203-40.000.

Jaeggi, Franz-Josef, to Ciba-Geigy Corporation. Process for the preparation of 2-alkoxybenzosulfonamides. 4,709,092, Cl. 564-89.000.

Janashak, Robert J.; Felice, Christopher G.; and Akeel, Hadi A., to GMF Robotics Corporation. Method and apparatus for automated filling of a container with a fluid. 4,708,175, Cl. 141-1.000.

Janitz, Bernt, to 501 A/s Moss Glasvaerk. Device for testing of containers as to leakage or defects. 4,708,014, Cl. 73-37.000.

Jankkila, Martti J.: *See*—
Honkaniemi, Matti E.; Mustikka, Lauri A.; Jankkila, Martti J.; Hokkanen, Pentti O.; Heikkila, Risto M.; and Lilja, Launo L., 4,708,640, Cl. 432-14.000.

Janos, Szabo : *See*—
Egon, Janosdeak; Tibor, Gergely; and Janos, Szabo , 4,708,226, Cl. 188-251.00A.

Jansons, Viktors; and Gors, Heinrich C., to Raychem Corporation. Preparation of aromatic polymers. 4,709,007, Cl. 528-222.000.

Jaouhari, Rabih: *See*—
Tkatchenko, Igor; Jaouhari, Rabih; Bonnet, Michel; Dawkins, Gordon; and Lecolier, Serge, 4,709,087, Cl. 560-339.000.

Jasper, James J. Orthodontic device for correcting the bite. 4,708,646, Cl. 433-19.000.

Jennings, Alfred R., Jr., to Mobil Oil Corporation. Removing particulate matter from a non-dissoluble sand control pack. 4,708,206, Cl. 166-281.000.

Jennings, Charles E.; and Thames, Edward E., to Vetco Gray Inc. Hydraulic collet-type connector. 4,708,376, Cl. 285-315.000.

Jensen, Richard H., to Ancra Corporation. Rattle-proof anchor fitting for securing loads to retainer track. 4,708,549, Cl. 410-105.000.

Jermann, Daniel: *See*—
Merkli, Peter; and Jermann, Daniel, 4,708,561, Cl. 412-25.000.

Jhabvala, Murzban D.; Dargo, David R.; and Lyons, John C., to United States of America, Administrator, National Aeronautics and Space Administration. Integrated photo-responsive metal oxide semiconductor circuit. 4,709,252, Cl. 357-30.000.

Jinushi, Shinji: *See*—
Mabuchi, Akira; and Jinushi, Shinji, 4,708,794, Cl. 428-31.000.

Johannson, Bo Ingemar W.: *See*—
Larsson, Lars-Ake L.; Nilsson, Ake W.; Johannson, Bo Ingemar W.; and Naucler, Lars Olof V., 4,708,714, Cl. 604-5.000.

John Fluke Mfg. Co., Inc.: *See*—
Scott, Marshall H.; and Polstra, John D., 4,709,366, Cl. 371-20.000.

John H. Harland Company: *See*—
Voshall, Donald K.; and Strickland, Danny K., 4,709,396, Cl. 383-5.000.
Voshall, Donald K.; and Strickland, Danny K., 4,709,397, Cl. 383-5.000.

Johns Hopkins University, The: *See*—
Newman, Arnold L.; and Stanbro, William D., 4,708,765, Cl. 156-626.000.

Johnsen, John L.; Wood, William E.; Devletian, Jack H.; and Spring, Donald G., to Huck Manufacturing Company. Welding alloy and method of making and using the same. 4,708,282, Cl. 228-263.160.

Johnson & Johnson Dental Products Company: *See*—
Holewinski, Robert D.; Blatherwick, William J.; Hamilton, Leslie; and Wells, Thomas E., Sr., 4,708,650, Cl. 433-90.000.

Johnson, Kenneth W.: *See*—
Burough, Irvin G.; Pellissier, Robert O.; and Johnson, Kenneth W., 4,709,150, Cl. 250-338.000.

Johnson, Robert G., to Honeywell Inc. Flow sensor furnace control. 4,708,636, Cl. 431-20.000.

Johnson, Rodney C., to Bestobell Sparling Limited. Fluid flow monitoring. 4,708,022, Cl. 73-861.280.

Johnson, Thomas A.; and Cooper, Cawas A., to Air Products and Chemicals, Inc. Synthesis of heterocyclic amines via the reaction of dialkylene glycol and ammonia. 4,709,028, Cl. 544-106.000.

Jolin, Terry H.: *See*—
Carlson, Michael G.; Ward, Ronald A.; and Jolin, Terry H., 4,708,315, Cl. 249-192.000.

Jonczyk, Alfred: *See*—
Holzemann, Gunter; Raddatz, Peter; Jonczyk, Alfred; and Schmitges, Claus J., 4,709,010, Cl. 530-323.000.

Jones, Barry N.: *See*—
Gilligan, James P.; and Jones, Barry N., 4,708,934, Cl. 435-68.000.

Joosten, Johannes J. M.: *See*—
Hartgring, Cornelius D.; and Joosten, Johannes J. M., 4,709,255, Cl. 357-23.500.

Jordan, William D.; and Clemens, Donald L., to Thermalloy Incorporated. Alignment apparatus for electronic device package. 4,709,302, Cl. 361-388.000.

JRB Company, Inc.: *See*—
Baird, James R.; and Kabay, Steve, 4,708,579, Cl. 414-723.000.

Judy, Charles R.: *See*—
Dahlstrom, David K.; Fife, Merrill E.; and Judy, Charles R., 4,709,361, Cl. 367-165.000.

Jung, Chu W.; Garrou, Philip E.; and Strickler, Gary R., to Dow Chemical Company, The. Disproportionation of alkenes. 4,709,115, Cl. 585-643.000.

Jung, Klaus, to Schon & Cei, GmbH. Punching machine. 4,708,042, Cl. 83-112.000.

Junghans, Rudi, to Heidelberger Druckmaschinen AG. Inking unit for rotary printing machines. 4,708,059, Cl. 101-350.000.

Kabay, Steve: *See*—
Baird, James R.; and Kabay, Steve, 4,708,579, Cl. 414-723.000.

kabelmetal electro Gesellschaft mit beschrankter Haftung: *See*—
Schauer, Friedrich, 4,707,914, Cl. 29-872.000.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Asari, Akira; and Inoue, Youichi, 4,708,627, Cl. 425-405.00H.

Kabushiki Kaisha Komatsu Seisakusho: *See*—
Hattori, Hisashi; Takenoshita, Hidemitsu; and Hanada, Yoichiro, 4,708,068, Cl. 110-245.000.

Kabushiki Kaisha Murakoshi Seiko: *See*—
Mazaki, Yoshiyuki, 4,708,410, Cl. 312-138.00R.

Kabushiki Kaisha Osaka Jidoki Seisakusho: *See*—
Nomura, Kohei, 4,708,233, Cl. 198-397.000.

Kabushiki Kaisha S.K.K.: *See*—
Morita, Shigeru; and Sugaya, Yukio, 4,709,222, Cl. 337-273.000.

Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho: *See*—
Nakano, Tasuku; Kouno, Kazuo; Hibino, Kazunari; and Sakursai, Masashi, 4,708,365, Cl. 280-801.000.

Kabushiki Kaisha Toshiba: *See*—
Arima, Takahisa; Ninomiya, Susumu; Horikawa, Yuji; and Aoki, Tadasi, 4,708,372, Cl. 285-150.000.
Hayano, Makoto; Nagatomo, Shigemi; Sakata, Hirotsugu; Hatori, Mitsuo; and Hattori, Hitoshi, 4,708,607, Cl. 418-55.000.
Itakura, Tetsuro; Kasagi, Yoshitaka; Koyama, Mikio; and Nakagawara, Chikashi, 4,709,408, Cl. 455-260.000.
Machida, Yoshio; and Kasugai, Takao, 4,709,211, Cl. 324-309.000.
Ogawa, Takashi; Shirogami, Tamotsu; and Murata, Kenji, 4,708,916, Cl. 429-38.000.
Sano, Masaki; and Osafune, Koji, 4,709,279, Cl. 360-78.000.
Sera, Michitoshi; Watanabe, Mitukazu; and Aoki, Kiyoshi, 4,708,613, Cl. 425-117.000.
Shiraishi, Isao, 4,708,236, Cl. 198-468.200.
Tamura, Masafumi; Uchiyama, Arisa; Kondo, Takashi; and Kageyama, Satoshi, 4,709,264, Cl. 358-93.000.
Watanabe, Junji, 4,708,486, Cl. 358-296.000.
Yamaura, Mitsuru; Inagaki, Junichi; and Ito, Hachidai, 4,709,295, Cl. 361-80.000.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Ogo, Kazutaka; Hayashi, Masahiro; Suzuki, Takatoshi; Hokao, Katsuiku; Asai, Akio; and Tsuruhashi, Takayuki, 4,709,198, Cl. 318-571.000.

Kabushiki Kaisha Tsuchiya Seisakusho: *See*—
Yogo, Takeji; Nakagaki, Akitsuna; Miyazawa, Akio; Mitomo, Takeshi; and Ichihara, Takayuki, 4,708,199, Cl. 165-167.000.

Kabushikikaisha Tokyo Keiki: *See*—
Hojo, Takeshi; and Nakaishi, Takafumi, 4,708,024, Cl. 74-5.470.

Kadokura, Susumu; Sawayama, Ippei; Kato, Tomoaki; and Okamoto, Tadashi, to Canon Kabushiki Kaisha. Sheet coil. 4,709,221, Cl. 336-200.000.

Kadoya, Atsushi: *See*—
Tsumura, Takeo; Iwai, Hiroji; and Kadoya, Atsushi, 4,708,505, Cl. 400-697.100.

Kagabu, Shinzo: *See*—
Kurahashi, Yoshio; Shiokawa, Kozo; Goto, Toshio; Kagabu, Shinzo; Matsumoto, Noboru; and Moriya, Koichi, 4,708,953, Cl. 514-166.000.

Kage, Kouzou, to NEC Corporation. Received signal processing apparatus. 4,709,376, Cl. 375-58.000.

Kageyama, Satoshi: *See*—
Tamura, Masafumi; Uchiyama, Arisa; Kondo, Takashi; and Kageyama, Satoshi, 4,709,264, Cl. 358-93.000.

Kagiyama, Takashi: *See*—
Utsumi, Shigeo; Kanesaki, Tateo; Kagiyama, Takashi; Otonari, Satoshi; Ikushima, Koichiro; and Okumura, Norio, 4,708,902, Cl. 428-141.000.

Kahle, Brewster L.: *See*—
Hillis, W. Daniel; Knight, Thomas F., Jr.; Bawden, Alan; Kahle, Brewster L.; Chapman, David; Christman, David P.; Lasser, Cliff A.; and Feynman, Carl R., 4,709,327, Cl. 364-200.000.

Kaiser, Klaus: *See*—
Born, Gerhard; and Kaiser, Klaus, 4,708,234, Cl. 198-453.000.

Kaizer, Adrianus J. M.; and Van Leeuwen, Gerrit H., to U.S. Philips Corporation. Arrangement for converting an electric signal into an acoustic signal or vice versa and a non-linear network for use in the arrangement. 4,709,391, Cl. 381-98.000.

Kaj, Goran L.: *See*—
Axen, Rolf E.; Kaj, Goran L.; and Bjorkman, Rune, 4,708,932, Cl. 435-7.000.

Kajigaya, Kazuhiko, to Hitachi, Ltd Semiconductor memory device having an improved wiring and decoder arrangement to decrease wiring delay. 4,709,351, Cl. 365-51.000.

Kajikawa, Yosiharu: *See*—
Ohta, Hiromi; Ogawa, Shinji; Kajikawa, Yosiharu; Fukumura, Keiichi; Tsuchiya, Kiyomitsu; Kittaka, Kiyoshi; and Narita, Katsushi, 4,707,999, Cl. 62-474.000.

Kajiura, Toshinori: *See*—
Sakaibara, Toru; Tsujioka, Shigeo; Kajiura, Toshinori; Aoshima, Toshihisa; and Tonomura, Motonobu, 4,709,231, Cl. 340-729.000.

Kakii, Toshiaki; Matsuno, Koichiro; Suzuki, Shuzo; Ashiya, Fumihiro; and Ishihara, Koushi, to Sumitomo Electric Industries, Ltd.; and Nippon Telegraph & Telephone Corporation. Optical connector and method of manufacturing a pair of ferrules therefor. 4,708,433, Cl. 350-96.220.

Kaladas, Jeffrey J.: *See*—
Schulz, Donald N.; and Kaladas, Jeffrey J., 4,708,998, Cl. 526-287.000.

Kalfayan, Leonard J.; Watkins, David R.; and Hewgill, Gregory S., to Union Oil Company of California. Scale removal treatment. 4,708,207, Cl. 166-295.000.

Kallay, Tamas: *See*—
Heja, Gergely; Korbonits, Dezso ; Palosi, Endre; Kiss, Pal; Gonczi, Csaba; Szvoboda nee Kanzel, Ida; Marvanyos, Ede; Kun, Judit; Szomor nee Wundele, Maria; Szabo, Gabor; Kallay, Tamas; and Ledniczky, Laszlo , 4,709,081, Cl. 560-100.000.

Kamachi, Hajime: *See*—
Iimura, Seiji; Abe, Yoshio; Okumura, Jun; Naito, Takayuki; and Kamachi, Hajime, 4,708,955, Cl. 514-202.000.

Kamanaka, Yoshiyuki: *See*—
Kubo, Haruaki; and Kamanaka, Yoshiyuki, 4,708,538, Cl. 408-59.000.

Kambe, Hirofumi: *See*—
Onda, Takanori; and Kambe, Hirofumi, 4,708,231, Cl. 192-103.00F.

Kambo Security Products Ltd.: *See*—
Ching, Hui P., 4,708,379, Cl. 292-337.000.

Kamei, Fumio: *See*—
Hashimoto, Sadakatsu; and Kamei, Fumio, 4,709,349, Cl. 364-900.000.

Kamejima, Kohji: *See*—
Hosoda, Yuji; Honma, Kazuo; Fujie, Masakatsu; Iwamoto, Taro; Kamejima, Kohji; and Nakano, Yoshiyuki, 4,709,342, Cl. 364-558.000.

Kamensky, Veniamin V.: *See*—
Shemyakin, Evgeny I.; Kamensky, Veniamin V.; Kostylev, Alexandr D.; Sudnishnikov, Boris V.; Tupitsyn, Sergei K.; Tupitsyn, Konstantin K.; Plavskikh, Vladimir D.; and Chepurnoi, Nikolai P., 4,708,211, Cl. 175-19.000.

Kamijo, Yoshimi, to Alps Electric Co., Ltd. Transparent electrode sheet. 4,708,914, Cl. 428-690.000.

Kaminski, Christopher A., to General Electric Company. Ventilated end turns for rotor windings of a dynamoelectric machine. 4,709,177, Cl. 310-59.000.

Kamiya, Masahiko: *See*—
Takagi, Kozi; Nomura, Ken; Hattori, Yoshiyuki; and Kamiya, Masahiko, 4,708,406, Cl. 303-115.000.

Kamoshita, Katsuzo: *See*—
Nagano, Eiki; Yoshida, Ryo; Matsumoto, Hiroshi; Hashimoto, Shunichi; and Kamoshita, Katsuzo, 4,709,049, Cl. 548-513.000.

Kampf, Arieh: *See*—
Hermolin, Joshua; and Kampf, Arieh, 4,709,100, Cl. 568-639.000.

Kamuro, Seisufumi; and Okada, Mikiro, to Sharp Kabushiki Kaisha. Reference voltage generating circuit for enhancement/depletion MOSFET load circuit for driving logic circuits. 4,709,168, Cl. 307-448.000.

Kanai, Takao: *See*—
Yamaguchi, Katsumi; Yokoi, Syouichiro; Kanai, Takao; and Yoshikawa, Kikuo, 4,708,302, Cl. 242-204.000.

Kanaoka, Tomizo: *See*—
Takano, Hiroshi; Takagi, Shinichi; Wada, Kiyokazu; Konishi, Sadaichi; and Kanaoka, Tomizo, 4,708,699, Cl. 474-144.000.

Kanazawa, Kyoetsu; and Ono, Mitsuo, to Nippon Gakki Seizo Kabushiki Kaisha. Pad cups for a wood wind. 4,708,047, Cl. 84-385.00P.

Kanda, Osamu, to Nippon Air Brake Co., Ltd. Brake signal conversion device for railway cars. 4,708,402, Cl. 303-20.000.

Kanebo Bell-Touch, Ltd.: *See*—
Hashizume, Masatora; Kudoh, Eiichi; Fujiwara, Setuzo; and Shiomi, Hitomi, 4,707,893, Cl. 24-446.000.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Tomita, Haruo; Okamoto, Yasuo; and Yonezawa, Kazuya, 4,709,062, Cl. 549-553.000.

Kaneko, Ichiro: *See*—
Shimizu, Toshihide; Kaneko, Ichiro; Watanabe, Mikio; and Shimakura, Yoshiteru, 4,708,890, Cl. 427-230.000.

Kaneko, Katsuyuki: *See*—
Nishimichi, Yoshito; Uya, Masaru; and Kaneko, Katsuyuki, 4,709,173, Cl. 307-243.000.

Kanesaki, Tateo: *See*—
Utsumi, Shigeo; Kanesaki, Tateo; Kagiyama, Takashi; Otonari, Satoshi; Ikushima, Koichiro; and Okumura, Norio, 4,708,902, Cl. 428-141.000.

Kanke, Atsushi: *See*—
Sasayama, Takao; Oho, Shigeru; Kanke, Atsushi; Shibata, Takanori; and Endo, Akira, 4,708,480, Cl. 356-350.000.

Kanner, Bernard: *See*—
Chu, Nan S.; and Kanner, Bernard, 4,709,067, Cl. 556-440.000.

Kanno, Isao; and Yamamoto, Yasuo, to Sanshin Kogyo Kabushiki Kaisha. Warning device for a watercraft provided with a plurality of marine propulsion engines. 4,708,669, Cl. 440-1.000.

Kanno, Nobumori: *See*—
Ohtsuki, Akira; Konno, Ryozo; Kanno, Nobumori; Sugai, Makio; Miboya, Takashi; Kubota, Yuichi; Nishimatsu, Masaharu; Isobe, Yukihiro; Tanaka, Kazushi; and Shinoura, Osamu, 4,708,909, Cl. 428-425.900.

Kanto, Masaharu; Akiyoshi, Eiichi; and Ohtake, Yasuhisa, to Tokyo Shibaura Denki Kabushiki Kaisha. Color picture tube and method for manufacturing the same. 4,708,680, Cl. 445-47.000.

Kao Corporation: *See*—
Fukumoto, Yasuhisha; and Moriyama, Moboru, 4,709,091, Cl. 562-595.000.
Kubo, Makoto; Sotoya, Koshiro; and Okabe, Kazuhiko, 4,709,045, Cl. 548-352.000.

Kapler, Albert W.; and Kapler, Joseph A. Apparatus for eliminating noise in conductive-bearing electrical connectors. 4,708,658, Cl. 439-21.000.

Kapler, Joseph A.: *See*—
Kapler, Albert W.; and Kapler, Joseph A., 4,708,658, Cl. 439-21.000.

Kar, Nareshchandra J., to Smith International, Inc. Process for laser hardening drilling bit cones having hard cutter inserts placed therein. 4,708,752, Cl. 148-127.000.

Karapetian, Artur K.: *See*—
Mkhikian, Robert M.; Shaginian, Suren G.; Markarian, Temur G.; Khaidukov, Georgy K.; Velidzhanian, Sofia V.; Manukian, Artashes R.; Karapetian, Artur K.; Kazarian, Aram V.; and Airapetian, Robert R., 4,708,628, Cl. 425-406.000.

Karbach, Stefan: *See*—
Schirmer, Ulrich; Karbach, Stefan; Pommer, Ernst-Heinrich; Ammermann, Eberhard; Steglich, Wolfgang; Schwalge, Barbara A. M.; and Anke, Timm, 4,709,078, Cl. 560-060.000.

Kasagi, Yoshitaka: *See*—
Itakura, Tetsuro; Kasagi, Yoshitaka; Koyama, Mikio; and Nakagawara, Chikashi, 4,709,408, Cl. 455-260.000.

Kasamatsu, Tadashi. Film-forming T die for low viscosity resin. 4,708,629, Cl. 425-466.000.

Kasperkovitz, Wolfdietrich G., to U.S. Philips Corporation. Current-discrimination arrangement. 4,709,163, Cl. 307-297.000.

Kasugai, Takao: *See*—
Machida, Yoshio; and Kasugai, Takao, 4,709,211, Cl. 324-309.000.

Kataoka, Hiroshi. Take-out/take-up tension control apparatus. 4,708,301, Cl. 242-75.510.

Katayama, Kazuso; Ichiryuu, Taku; Mouri, Yasushi; Mitsuhashi, Tsuneyoshi; and Kobayashi, Masanori, to Mitsubishi Jukogyo Kabushiki Kaisha. Centrifugal compressor. 4,708,587, Cl. 415-104.000.

Kato, Kazuo: *See*—
Someno, Tetsuya; Kato, Kazuo; Takahashi, Yasushi; Ishii, Shinichi; Takeuchi, Tomio; and Umezawa, Hamao, 4,708,944, Cl. 502-7.000.

Kato, Manabu: *See*—
Hara, Seinosuke; Ofuji, Hiromichi; Miisyo, Kazuyuki; Matsumoto, Yasuo; and Kato, Manabu, 4,708,101, Cl. 123-90.160.

Kato, Masakazu; and Takoshima, Takehiro, to Alps Electric Co., Ltd. Thermal head and method for manufacture thereof. 4,709,243, Cl. 346-76.0PH.

Kato, Tomoaki: *See*—
Kadokura, Susumu; Sawayama, Ippei; Kato, Tomoaki; and Okamoto, Tadashi, 4,709,221, Cl. 336-200.000.

Kato, Toshiji; and Omori, Tatsuya, to Onkyo Kabushiki Kaisha. Dome speaker with a diaphragm having at least one elongated cut-out portion. 4,709,392, Cl. 381-193.000.

Katogi, Kouzou: *See*—
Kugo, Masaru; Ouchi, Hideyuki; Katogi, Kouzou; Igarashi, Osamu; Sada, Seiji; Tokuyama, Keiichi; and Yamamura, Hirohisa, 4,708,440, Cl. 350-339.00F.
Katoh, Yoshinori: *See*—
Yamatsu, Isao; Abe, Shinya; Inai, Yuichi; Suzuki, Takeshi; Kinoshita, Kensaku; Mishima, Mannen; Katoh, Yoshinori; Kobayashi, Seiichi; Murakami, Manabu; and Yamada, Kouzi, 4,709,079, Cl. 560-66.000.
Katou, Yasuo: *See*—
Takahashi, Haruhiko; Inui, Toshiharu; Saitoh, Hiroyuki; Ishikawa, Noriyoshi; Funato, Hitoshi; Ohmori, Takashi; Kurata, Masami; and Katou, Yasuo, 4,709,149, Cl. 250-317.100.
Katsuno, Toshiyasu; Nagai, Toshinari; Masui, Takatoshi; and Satou, Yasushi, to Toyota Jidosha Kabushiki Kaisha. Double air-fuel ratio sensor system having improved response characteristics. 4,707,984, Cl. 60-274.000.
Katsuno, Toshiyasu: *See*—
Nagai, Toshinari; Masui, Takatoshi; Sato, Yasushi; and Katsuno, Toshiyasu, 4,707,985, Cl. 60-274.000.
Katsurahira, Yuji: *See*—
Murakami, Azuma; Katsurahira, Yuji; and Taguchi, Yoshinori, 4,709,209, Cl. 324-207.000.
Kauschinger, Martin: *See*—
Wenake, Hanno; Gallien, Arnold; Kauschinger, Martin; Unger, Klaus; Brendel, Josef; and Lampe, Lutz, 4,709,182, Cl. 310-316.000.
Kawabe, Ryoichi; Iwasaki, Tetsuo; Kozuru, Hiroshi; Yoda, Masashi; Matsunaga, Masakazu; Takamori, Takesi; and Nakasima, Matao, to F.M. Valve Manufacturing Co., Ltd. Toilet-flushing control apparatus. 4,707,867, Cl. 4-313.000.
Kawaguchi, Hiroshi: *See*—
Konishi, Masataka; Saitoh, Kyoichiro; Ohkuma, Hiroaki; and Kawaguchi, Hiroshi, 4,708,872, Cl. 424-115.000.
Kawaguchi, Toshiyuki: *See*—
Yokoi, Shigeo; Isozaki, Takashi; Yamamoto, Ryuta; and Kawaguchi, Toshiyuki, 4,709,330, Cl. 364-400.000.
Kawai, Masahiko: *See*—
Akimoto, Taizo; and Kawai, Masahiko, 4,709,268, Cl. 358-150.000.
Kawai, Masao: *See*—
Harada, Yoshiharu; Taga, Yutaka; Fukumura, Kagenori; Hayakawa, Yoichi; and Kawai, Masao, 4,708,032, Cl. 74-866.000.
Kawamoto, Hiroshi: *See*—
Okamura, Hisashi; Kawamoto, Hiroshi; and Sakakibara, Yoshio, 4,708,927, Cl. 430-564.000.
Shimohigashi, Katsuhiro; Masuda, Hiroo; Ikuzaki, Kunihiko; and Kawamoto, Hiroshi, 4,709,353, Cl. 365-205.000.
Kawamoto, Masako: *See*—
Ikematsu, Hideaki; and Kawamoto, Masako, 4,707,864, Cl. 4-144.300.
Kawamura, Fumio: *See*—
Fukasawa, Tetsuo; Kawamura, Fumio; and Kikuchi, Makoto, 4,708,822, Cl. 252-628.000.
Kawamura, Sinobu: *See*—
Enami, Katsuya; Kawamura, Sinobu; Nagase, Fumio; and Aikawa, Shinichi, 4,709,285, Cl. 360-104.000.
Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Takada, Toshiyuki; Fukui, Noboru; and Shimizu, Akihito, 4,707,986, Cl. 60-310.000.
Taniguchi, Akira; Ojio, Kuniji; Yamamoto, Tatsuya; and Sana, Toshikazu, 4,708,761, Cl. 156-516.000.
Watanabe, Katumi, 4,708,671, Cl. 440-41.000.
Kawasaki, Katsuhiro, to Toho Yogyo Kabushiki Kaisha. Ring grinding tool. 4,707,950, Cl. 51-401.000.
Kawasaki Steel Corporation: *See*—
Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Shiozumi, Motoji; Takahashi, Kunio; Torao, Akira; Moriya, Susumu; and Momose, Atsushi, 4,708,882, Cl. 427-1.000.
Satoh, Susumu; Suzuki, Hideo; Obara, Takashi; Nishida, Minoru; and Hashimoto, Osamu, 4,708,748, Cl. 148-2.000.
Kawasaki, Tsutomu: *See*—
Inoue, Kazuhiko; Kawasaki, Tsutomu; and Ihana, Toshio, 4,709,281, Cl. 360-97.000.
Kay, Ian T.; and Noon, Robert A., to Imperial Chemical Industries PLC. Biologically active amides. 4,709,038, Cl. 546-316.000.
Kazarian, Aram V.: *See*—
Mkhikian, Robert M.; Shaginian, Suren G.; Markarian, Temur G.; Khaidukov, Georgy K.; Velidzhanian, Sofia V.; Manukian, Artashes R.; Karapetian, Artur K.; Kazarian, Aram V.; and Airapetian, Robert R., 4,708,628, Cl. 424-406.000.
Keana, John F.: *See*—
Weber, Eckard; Sonders, Mark; and Keana, John F., 4,709,094, Cl. 564-238.000.
Kearton, William B.; Kloes, Kenneth A.; and Terry, Joel R., to Westinghouse Electric Corp. Reactor monitoring assembly. 4,708,844, Cl. 376-247.000.
Keck, Henry C.; and Fujitaki, Roy K., to Bobrick Washroom Equipment, Inc. Wall mounted dryer. 4,707,933, Cl. 34-97.000.
Keeffe, William M.; and Krasko, Zeya K., to GTE Products Corporation. Low wattage metal halide lamp. 4,709,184, Cl. 313-638.000.
Keintzel, Gunter; and Westebbe, Klaus, to L. & C. Steinmuller GmbH. Apparatus for drying and superheating steam. 4,708,093, Cl. 122-483.000.
Keiper Recaro GmbH & Co.: *See*—
Werner, Heinz; and Walk, Hansjorg, 4,708,392, Cl. 297-362.000.
Kellar, Paul R. N.: *See*—
Taylor, Richard J.; Kellar, Paul R. N.; and Hinson, Neil R., 4,709,393, Cl. 382-41.000.
Kelleghan, William J.: *See*—
Lau, Kreisler S. Y.; and Kelleghan, William J., 4,708,991, Cl. 525-275.000.
Keller, Reinhold, to Hoechst Aktiengesellschaft. Preparation of alkyl N-maleylphenylalanate. 4,709,075, Cl. 560-41.000.
Kelley, Henry L.; and Wilson, John C., to United States of America, National Aeronautics and Space Administration. Helicopter anti-torque system using fuselage strakes. 4,708,305, Cl. 244-17.190.
Kellie, James L. F.; and Cowell, Andrew J. J., to London & Scandinavian Metallurgical Co. Limited. Grain refining metals. 4,708,739, Cl. 75-76.000.
Kellogg, Robert L.; Zimmerman, Roger W.; and Bryan, Carney J., to Blue Bell, Inc. Method for processing fabric pieces in a cut and sew operation. 4,708,073, Cl. 112-262.300.
Kembo, Yukio: *See*—
Komeyama, Yoshihiro; Kembo, Yukio; Kuni, Asahiro; Funatsu, Ryuuichi; Inagaki, Akira; Ikeda, Minoru; and Okamoto, Keiichi, 4,708,484, Cl. 356-401.000.
Kemerer, Beverly K., to Dow Corning Corporation. Cleaning and waterproofing composition. 4,708,807, Cl. 252-8.600.
Kendrick, Richard L. Collapsible femur traction device. 4,708,131, Cl. 128-85.000.
Kenji, Yabusaki; Hitoshi, Tozawa; Akira, Noda; and Takashi, Iito, to Tokyo Kogaku Kikai Kabushiki Kaisha. Photometer. 4,708,477, Cl. 356-222.000.
Kennametal Inc.: *See*—
Erickson, Robert A., 4,708,040, Cl. 82-36.00B.
Kennon, Ronnie. Home entertainment accessory organizer. 4,708,408, Cl. 312-9.000.
Kent-Moore Corporation: *See*—
Lindquist, Craig B.; and Bihn, Robert F., 4,708,667, Cl. 439-788.000.
Kepplinger, Werner: *See*—
Hauk, Rolf; and Kepplinger, Werner, 4,708,736, Cl. 75-26.000.
Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See*—
Boden, Karl; Ibach, Harald; and Linke, Udo, 4,708,764, Cl. 156-617.00R.
Kerr Measurement Systems, Inc.: *See*—
Kerr, Wayne L., 4,709,208, Cl. 324-206.000.
Kerr, Wayne L., to Kerr Measurement Systems, Inc. Magnetic mark detector system. 4,709,208, Cl. 324-206.000.
Kessler, Erich: *See*—
Gerlach, Klaus; Kessler, Erich; and Henne, Werner, 4,708,799, Cl. 210-500.230.
Keuro Maschinenbau Gesellschaft mit beschrankter, Haftung & Co. Kommanditgesellschaft: *See*—
Stolzer, Paul; and Spath, Dieter, 4,708,566, Cl. 414-276.000.
Key Pharmaceuticals, Inc.: *See*—
Hsiao, Charles H., 4,708,867, Cl. 424-80.000.
Khaidukov, Georgy K.: *See*—
Mkhikian, Robert M.; Shaginian, Suren G.; Markarian, Temur G.; Khaidukov, Georgy K.; Velidzhanian, Sofia V.; Manukian, Artashes R.; Karapetian, Artur K.; Kazarian, Aram V.; and Airapetian, Robert R., 4,708,628, Cl. 425-406.000.
Khoe, Giok D., to U.S. Philips Corp. Electro-optical device comprising a laser diode, and input transmission fibre and an output transmission fibre. 4,708,426, Cl. 350-96.180.
Kidd, Archibald W. Solid fuel heating appliance. 4,708,069, Cl. 110-275.000.
Kidera, Edward H., to Abbott Laboratories. Pressure surface for a peristaltic pump. 4,708,604, Cl. 417-477.000.
Kiefer, Heinz: *See*—
Doderer, Gerhard; Kiefer, Heinz; and Krieger, Willi, 4,708,706, Cl. 493-295.000.
Kiefer, Wilhelm H. Method and apparatus for making a dental model mounted on a base plate. 4,708,835, Cl. 264-17.000.
Kiekert GmbH & Co. Kommanditgesellschaft: *See*—
Ingenhoven, Jurgen, 4,708,378, Cl. 292-201.000.
Kikuchi, Jiro, to Alps Electric Co., Ltd. Apparatus for controlling output power of transmitter. 4,709,403, Cl. 455-126.000.
Kikuchi, Makoto: *See*—
Fukasawa, Tetsuo; Kawamura, Fumio; and Kikuchi, Makoto, 4,708,822, Cl. 252-628.000.
Kikuchi, Satoru: *See*—
Kitahara, Toshihiro; Sakai, Yoshiaki; Kobayashi, Kou; and Kikuchi, Satoru, 4,709,283, Cl. 360-99.000.
Kilcher, Beat: *See*—
Del Bello, Athos; and Kilcher, Beat, 4,709,131, Cl. 219-69.00M.
Kilmer, Lauren G.; and Carter, John W., Jr. Hydraulic core cutting motor. 4,708,213, Cl. 175-78.000.
Kim, In Suk. Device for contact protection and arc prevention of a switch. 4,709,294, Cl. 361-58.000.
Kim, Young H., to Gold Star Co., Ltd. Tape guide construction of a head drum of a videocassette recorder. 4,709,289, Cl. 360-130.240.
Kime, James A., to Hydro-Horse, Inc. Pumping apparatus. 4,707,993, Cl. 60-372.000.
Kimura, Akiyoshi: *See*—
Kubota, Atsushi; Tanishi, Shinnosuke; Sasaki, Shinichi; Kimura, Akiyoshi; and Koike, Michiro, 4,708,455, Cl. 355-3.00R.
Kimura, Katsuji: *See*—
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Kimura, Kazuo; and Maruyama, Masao, to Tsubakimoto Chain Co. Tensioner for toothed drive belts. 4,708,696, Cl. 474-103.000.

King, Martin J.: *See*—
Troutner, Vernon H.; and King, Martin J., 4,708,715, Cl. 604-6.000.

King, Norman R.: *See*—
Dunn, John P.; Collins, Kent L.; and King, Normaa R., 4,708,679, Cl. 445-26.000.

Kingston-Warren Corporation, The: *See*—
Azzi, Victor D., 4,708,252, Cl. 211-192.000.

Kinoshita, Kensaku: *See*—
Yamatsu, Isao; Abe, Shinya; Inai, Yuichi; Suzuki, Takeshi; Kinoshita, Kensaku; Mishima, Mannen; Katoh, Yoshinori; Kobayashi, Seiichi; Murakami, Manabu; and Yamada, Kouzi, 4,709,079, Cl. 560-66.000.

Kinoshita, Roy Y., to Rockwell International Corporation. Solid state dc power switch. 4,709,160, Cl. 307-253.000.

Kinugawa Rubber Ind. Co., Ltd.: *See*—
Tabata, Toshiyuki; Aikawa, Hiroshi; Fujiwara, Yoshinari; and Yoda, Norio, 4,708,329, Cl. 267-140.100.

Kinzel, Richard: *See*—
Gaa, Roland; and Kinzel, Richard, 4,708,116, Cl. 123-506.000.

Kirchmayr, Rudolf; and Rutsch, Werner, to Ciba-Geigy Corporation. Process for preparing relief images using acid-curable resins and masked curing catalysts. 4,708,926, Cl. 430-306.000.

Kirk, David L., to Honeywell Inc. Method and apparatus for synchronizing the timing subsystems of the physical modules of a local area network. 4,709,347, Cl. 364-900.000.

Kirkpatrick, Charles C., to Dow Chemical Company, The. Polymerization of cyclic dihalophosphazene oligomers. 4,708,858, Cl. 423-300.000.

Kirksey, Kirby: *See*—
Bockrath, Richard E.; and Kirksey, Kirby, 4,708,806, Cl. 210-754.000.

Kish, Robert J.: *See*—
Conboy, Stewart J.; and Kish, Robert J., 4,708,574, Cl. 414-591.000.

Kishi, Hiroshi; Oshio, Minoru; Murai, Shunji; Wada, Takeshi; and Fukui, Masami, to Taiyo Yuden Co., Ltd. Low temperature sintered ceramic capacitor with a temperature compensating capability, and method of manufacture. 4,709,299, Cl. 361-321.000.

Kiss, Pal: *See*—
Heja, Gergely; Korbonits, Dezso; Palosi, Endre; Kiss, Pal; Gonczi, Csaba; Szvoboda nee Kanzel, Ida; Marvanyos, Ede; Kun, Judit; Szomor nee Wundele, Maria; Szabo, Gabor; Kallay, Tamas; and Ledniczky, Laszlo, 4,709,081, Cl. 560-100.000.

Kitade, Nobumitsu, to Fuji Jukogyo Kabushiki Kaisha. System for controlling a transfer clutch of a four-wheel drive vehicle. 4,708,227, Cl. 192-0.055.

Kitahara, Toshihiro; Sakai, Yoshiaki; Kobayashi, Kou; and Kikuchi, Satoru, to Teac Corporation. Recording disk centering and clamping apparatus. 4,709,283, Cl. 360-99.000.

Kitayama, Tooru: *See*—
Iizuka, Kenichi; Kitayama, Tooru; Uzuhashi, Hideo; and Aoki, Hideo, 4,709,317, Cl. 363-37.000.

Kitazawa, Shooji, to OKI Electric Industry Co., Ltd. MOS read-only memory systems. 4,709,352, Cl. 365-104.000.

Kitsunai, Hiroyuki: *See*—
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Kittaka, Kiyoshi: *See*—
Ohta, Hiromi; Ogawa, Shinji; Kajikawa, Yosiharu; Fukumura, Keiichi; Tsuchiya, Kiyomitsu; Kittaka, Kiyoshi; and Narita, Katsushi, 4,707,999, Cl. 62-474.000.

Kitzinger, Frank; and Labuc, Vladimir M., to Noranda Inc. Metal surface temperature monitor. 4,708,495, Cl. 374-154.000.

Kiwi Coders Corporation: *See*—
Siegal, Burton L.; and Leshuk, Daniel J., 4,708,260, Cl. 220-465.000.

Kiyomiya, Yutaka: *See*—
Sasaki, Yutaka; Kiyomiya, Yutaka; and Nakamura, Toshio, 4,709,070, Cl. 558-322.000.
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Kizu, Soujiro: *See*—
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Klassen, William E.: *See*—
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Klauke, Erich: *See*—
Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hanssler, Gerd, 4,708,731, Cl. 71-90.000.

Kleber, Rolf: *See*—
Bathelt, Heinrich; Ehrl, Winfried; Wehowsky, Frank; Kleber, Rolf; Lotz, Werner; Glenz, Wolfgang; Herdt, Hubert; Jackel, Lothar; Mast, Jan-Hilbert; Hintermeier, Karl; and Muller, Manfred, 4,709,074, Cl. 560-33.000.

Klein, David A., to AMP Incorporated. Connector assembly with pre-staged terminal retainer. 4,708,662, Cl. 439-353.000.

Klein, Hans-Christof, to Alfred Teves GmbH. Brake system for the control of brake force distribution and slip. 4,708,401, Cl. 303-6.00R.

Kleiner, Hans-Jerg, to Hoechst Aktiengesellschaft. Process for the preparation of chloro(phenyl)phospines. 4,708,824, Cl. 260-543.00P.

Kleinerman, Marcos. Methods and devices for the optical measurement of temperature with luminescent materials. 4,708,494, Cl. 374-161.000.

Kleinknecht, Hans P., to RCA Corporation. Optical imager with diffractive lenticular array. 4,708,436, Cl. 350-162.170.

Klemmt, Karl-Heinz: *See*—
Hucking, Ernst E.; and Klemmt, Karl-Heinz, 4,709,228, Cl. 340-365.00S.

Klockner-Becorit GmbH: *See*—
Nowak, Dieter, 4,708,396, Cl. 299-34.000.

Kloes, Kenneth A.: *See*—
Kearton, William B.; Kloes, Kenneth A.; and Terry, Joel R., 4,708,844, Cl. 376-247.000.

Kloker, Kevin L., to Motorola, Inc. Data procesor control unit having an interrupt service using instruction prefetch redirection. 4,709,324, Cl. 364-200.000.

Klomp, Edward D., to General Motors Corporation. Spare tire installation without conventional jack. 4,708,400, Cl. 301-38.00S.

Knapp, George P.; Higgins, Bobby W.; and Roller, Durward W., to Chrysler Motors Corporation. Vehicle assembly method. 4,709,337, Cl. 364-468.000.

Knees, Karl: *See*—
Kness, Werner; and Knees, Karl, 4,707,916, Cl. 30-43.920.

Knepper, Larimer J., to New Holland Inc. Movable feeder floor for combines. 4,707,972, Cl. 56-10.200.

Kness, Werner; and Knees, Karl, to U.S. Philips Corporation. Shaver head for a dry shaver. 4,707,916, Cl. 30-43.920.

Knight, Clifton T.: *See*—
Bethea, James R.; and Knight, Clifton T., 4,708,615, Cl. 425-131.100.

Knight, Rodney A.: *See*—
Ostreicher, Eugene A.; Knight, Rodney A.; Fiore, Joseph V.; Emond, George T.; and Hou, Kenneth C., 4,708,803, Cl. 210-650.000.

Knight, Thomas F., Jr.: *See*—
Hillis, W. Daniel; Knight, Thomas F., Jr.; Bawden, Alan; Kahle, Brewster L.; Chapman, David; Christman, David P.; Lasser, Cliff A.; and Feynman, Carl R., 4,709,327, Cl. 364-200.000.

Knochel, Reinhard: *See*—
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Knoth, Wayne M.; and Corbin, Dennis O., to Universal Forest Products. Automatic lattice fabrication apparatus. 4,708,276, Cl. 227-7.000.

Knudsen, Hans J., to Danfoss A/S. Fuel burner pump assembly. 4,708,156, Cl. 137-117.000.

Kobayashi, Kou: *See*—
Kitahara, Toshihiro; Sakai, Yoshiaki; Kobayashi, Kou; and Kikuchi, Satoru, 4,709,283, Cl. 360-99.000.

Kobayashi, Masanori: *See*—
Katsyama, Kazuso; Ichiryuu, Taku; Mouri, Yasushi; Mitsuhashi, Tsuneyoshi; and Kobayashi, Masanori, 4,708,587, Cl. 415-104.000.

Kobayashi, Masashi, to Maruman Co., Ltd. Club-head. 4,708,347, Cl. 273-171.000.

Kobayashi, Seiichi: *See*—
Yamatsu, Isao; Abe, Shinya; Inai, Yuichi; Suzuki, Takeshi; Kinoshita, Kensaku; Mishima, Mannen; Katoh, Yoshinori; Kobayashi, Seiichi; Murakami, Manabu; and Yamada, Kouzi, 4,709,079, Cl. 560-66.000.

Kobayashi, Takehiro: *See*—
Emura, Masaharu; Uetsuki, Haruo; Aoki, Atsuhito; and Kobayashi, Takehiro, 4,708,303, Cl. 242-218.000.

Kober, Frederick P.; and Montefusco, Oscar V., to PolyCrystal Technologies Corp. Porous electrodes and method of making same. 4,707,911, Cl. 29-623.500.

Koblin, Abraham, to United States of America, Army. Persistent incapacitating chemical warfare composition and its use. 4,708,869, Cl. 424-81.000.

Kobold, Klaus. Control valve for automatically maintaining a constant fluid flow rate. 4,708,166, Cl. 137-512.100.

Kocourek, Peter C. Beach building block. 4,708,521, Cl. 405-31.000.

Kodaira, Takanori; and Egawa, Akira, to Canon Kabushiki Kaisha. Shutter control apparatus for use in variable focal length camera. 4,708,454, Cl. 354-422.000.

Koenck, Steven E.; and Hacker, David C., to Norand Corporation. Battery powered system. 4,709,202, Cl. 320-43.000.

Kohno, Hiroji: *See*—
Maruyama, Hitoshi; Ono, Isao; Kohno, Hiroji; Yamauchi, Junnosuke; and Okaya, Takuji, 4,708,947, Cl. 503-209.000.

Koike, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Supporting means for supporting a magnetic transducer for a double surface type flexible disk apparatus. 4,709,286, Cl. 360-105.000.

Koike, Michiro: *See*—
Kubota, Atsushi; Taniishi, Shinnosuke; Sasaki, Shinichi; Kimura, Akiyoshi; and Koike, Michiro, 4,708,455, Cl. 355-3.00R.

Koike, Mitsuhiro; Saijo, Yoshihiro; and Kume, Tadaaki, to Shikoku Kakooki Co., Ltd. Blank feeder for packaging machine. 4,708,707, Cl. 493-313.000.

Koike, Yoshiharu: *See*—
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Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
Ejiri, Yoshihiro; Nagai, Akira; Nakai, Taiichiro; and Niiro, Yasuhiko, 4,708,427, Cl. 350-96.200.

Kokusan Denki Co. Ltd.: *See*—
Nanjyo, Hirotoshi; and Suzuki, Hidetoshi, 4,708,112, Cl. 123-357.000.

Kolker, Carl W. Vehicle for the delivery of drinks. 4,708,572, Cl. 414-540.000.

Komatsuzaki, Katsuo: *See*—
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Komeyama, Yoshihiro; Kembo, Yukio; Kuni, Asahiro; Funatsu, Ryuuichi; Inagaki, Akira; Ikeda, Minoru; and Okamoto, Keiichi, to Hitachi, Ltd. Projection alignment method and apparatus. 4,708,484, Cl. 356-401.000.
Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Nagy, Mihaly; and Bacskai, Gyorgy, to Budapesti Vegyimuvek; and MTA Kozponti Kemiai I Kutato Intezet. Herbicidal 4-chloro-aryloxy-acetyl- and 4-chloro-aryloxy-propionyl-malonates. 4,708,733, Cl. 71-94.000.
Kondo, Nobuaki, to Nissan Motor Co., Ltd. Rear seat apparatus of a trunk through type. 4,708,385, Cl. 296-65.00R.
Kondo, Takashi: *See*—
Tamura, Masafumi; Uchiyama, Arisa; Kondo, Takashi; and Kageyama, Satoshi, 4,709,264, Cl. 358-93.000.
Kondoh, Masahiko; and Matsuoka, Hiroshi, to Fuji Photo Film Co., Ltd. Device for enlarging and projecting microfilm image. 4,708,463, Cl. 355-45.000.
Konishi, Masataka; Saitoh, Kyoichiro; Ohkuma, Hiroaki; and Kawaguchi, Hiroshi, to Bristol-Meyers Company. Antitumor antibiotic complex. 4,708,872, Cl. 424-115.000.
Konishi, Sadaichi: *See*—
Takano, Hiroshi; Takagi, Shinichi; Wada, Kiyokazu; Konishi, Sadaichi; and Kanaoka, Tomizo, 4,708,699, Cl. 474-144.000.
Konishi, Satoshi: *See*—
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Konishi, Takashi: *See*—
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Konishiroku Photo Industry Co., Ltd.: *See*—
Nagai, Tatsuo; Suzuki, Shinichi; and Yamazaki, Hiroshi, 4,708,924, Cl. 430-138.000.
Konno, Ryozo: *See*—
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Konno, Tetsuro: *See*—
Moritani, Nakanobu; Sugita, Mitsuyuki; Hoshino, Isamu; Yanagi, Hirofumi; Ikeno, Hitoshi; and Konno, Tetsuro, 4,709,218, Cl. 331-116.0FE.
Kono, Yoshihisa: *See*—
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Konopka, John G., to Zenith Electronics Corporation. Low voltage shutdown circuit. 4,709,320, Cl. 363-56.000.
Koop, Dale E.: *See*—
Rando, Joseph F.; and Koop, Dale E., 4,709,372, Cl. 372-58.000.
Kopsco, Michael A.; and Markow, Edward G., to Grumman Aerospace Corporation. Segmented-band banded tire. 4,708,186, Cl. 152-516.000.
Korbonits, Dezso : *See*—
Heja, Gergely; Korbonits, Dezso ; Palosi, Endre; Kiss, Pal; Gonczi, Csaba; Szvoboda nee Kanzel, Ida; Marvanyos, Ede; Kun, Judit; Szomor nee Wundele, Maria; Szabo, Gabor; Kallay, Tamas; and Ledniczky, Laszlo , 4,709,081, Cl. 560-100.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., to Du Pont de Nemours, E. I., and Company. Chip resistant primer composition I. 4,708,995, Cl. 525-450.000.
Korf Engineering GmbH: *See*—
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Kortright, Kenneth H.; and Hofbeinz, David E., to Coulter Corporation. Monoclonal antibody to a human carcinoma tumor associated antigen. 4,708,930, Cl. 435-7.000.
Koshimuzi, Koichi: *See*—
Sakata, Isao; Nakajima, Susumu; Koshimuzi, Koichi; Samejima, Natsuki; Inohara, Kazumi; and Takata, Hiroyuki, 4,709,022, Cl. 540-145.000.
Kostylev, Alexandr D.: *See*—
Shemyakin, Evgeny I.; Kamensky, Veniamin V.; Kostylev, Alexandr D.; Sudnishnikov, Boris V.; Tupitsyn, Sergei K.; Tupitsyn, Konstantin K.; Plavskikh, Vladimir D.; and Chepurnoi, Nikolai P., 4,708,211, Cl. 175-19.000.
Kouno, Kazuo: *See*—
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Kownurko, William A., to Combustion Engineering, Inc. Floating hydrometer with energy dissipating baffle. 4,708,017, Cl. 73-438.000.
Koyama, Mikio: *See*—
Itakura, Tetsuro; Kasagi, Yoshitaka; Koyama, Mikio; and Nakagawara, Chikashi, 4,709,408, Cl. 455-260.000.
Koyanagi, Toshimichi. Check valve. 4,708,167, Cl. 137-512.150.
Kozischek, James F.: *See*—
Ferentchak, Rudolph; Kozischek, James F.; and Schwartz, Jerome E., 4,708,967, Cl. 521-56.000.
Kozuki, Koichi, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument equipped with memorized randomly modifiable accompaniment patterns. 4,708,046, Cl. 84-1.030.
Kozuru, Hiroshi: *See*—
Kawabe, Ryoichi; Iwasaki, Tetsuo; Kozuru, Hiroshi; Yoda, Masashi; Matsunaga, Masakazu; Takamori, Takesi; and Nakasima, Matao, 4,707,867, Cl. 4-313.000.
Kraftwerk Union Aktiengesellschaft: *See*—
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Krapcho, John, to E. R. Squibb & Sons, Inc. Acylmercaptoalkanoyl and mercaptoalkanoyl spiro compounds. 4,709,046, Cl. 548-409.000.
Krasko, Zeya K.: *See*—
Keeffe, William M.; and Krasko, Zeya K., 4,709,184, Cl. 313-638.000.
Krasnoff, Eugene L., to Ingersoll-Rand Company. Liquid/abrasive jet cutting apparatus. 4,707,952, Cl. 51-410.000.
Kraus, Heinz, to Dr. Johannes Heidenhain GmbH. Incident-light phase grid and method for making same. 4,708,437, Cl. 350-162.230.
Krauss-Maffei A.G.: *See*—
Scherer, Manfred, 4,708,711, Cl. 494-41.000.
Krawza, Walter G.; Savanick, George A.; and Connors, Steven W., to United States of America, Interior. Rotatable end deflector for abrasive water jet drill. 4,708,214, Cl. 175-424.000.
Krieger, Willi: *See*—
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Krolick, Robert S.; Storey, James S.; and LeFever, Robin E., to Wind Production Company. Helicoidal structures, useful as wind turbines. 4,708,592, Cl. 416-176.00A.
Kruger, Hans-Rudolf: *See*—
Harre, Michael; Kruger, Hans-Rudolf; Arndt, Friedrich; and Rusch, Reinhart, 4,709,077, Cl. 560-056.000.
Krumm, Klemens: *See*—
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Krupp Widia GmbH: *See*—
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Kuau Technology, Ltd.: *See*—
Decker, John A., Jr., 4,707,926, Cl. 33-267.000.
Kubiak, Robert E., to Foxcraft, Inc. Tree stand with pin up system. 4,708,221, Cl. 182-187.000.
Kubica, Wladislaw: *See*—
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Kubo, Chikanari, to Eishin Technology Company, Ltd. Variable displacement pump. 4,708,603, Cl. 417-415.000.
Kubo, Haruaki; and Kamanaka, Yoshiyuki, to Daishowa Seiki Co., Ltd. Tapping head. 4,708,538, Cl. 408-59.000.
Kubo, Makoto; Sotoya, Koshiro; and Okabe, Kazuhiko, to Kao Corporation. Process for producing 1,2-substituted imidazoline compounds. 4,709,045, Cl. 548-352.000.
Kubo, Masahiro: *See*—
Donomoto, Tadashi; Tatematsu, Yoshiaki; Tanaka, Atsuo; and Kubo, Masahiro, 4,708,847, Cl. 420-129.000.
Kubo, Michihiro: *See*—
Nakamura, Toru; Konishi, Satoshi; Yamada, Seiji; Tatsuoka, Masahiko; and Kubo, Michihiro, 4,708,215, Cl. 177-25.000.
Kubo, Takashi: *See*—
Midooka, Masanori; Kubo, Takashi; Fujikawa, Atsunobu; and Motoda, Masanori, 4,708,351, Cl. 277-184.000.
Kubota, Atsushi; Taniishi, Shinnosuke; Sasaki, Shinichi; Kimura, Akiyoshi; and Koike, Michiro, to Canon Kabushiki Kaisha. Image forming apparatus and a process unit for use in the same. 4,708,455, Cl. 355-3.00R.
Kubota, Yuichi: *See*—
Ohtsuki, Akira; Konno, Ryozo; Kanno, Nobumori; Sugai, Makio; Mihoya, Takashi; Kubota, Yuichi; Nishimatsu, Masaharu; Isobe, Yukihiro; Tanaka, Kazushi; and Shinoura, Osamu, 4,708,909, Cl. 428-425.900.
Kuchii, Toshiyuki. Transistor inverter device for fluorescent lamp. 4,709,189, Cl. 315-209.00R.
Kudoh, Eiichi: *See*—
Hashizume, Masatora; Kudoh, Eiichi; Fujiwara, Setuzo; and Shiomi, Hitomi, 4,707,893, Cl. 24-446.000.
Kuech, Thomas F.: *See*—
Hovel, Harold J.; and Kuech, Thomas F., 4,708,883, Cl. 427-38.000.
Kugo, Masaru; Ouchi, Hideyuki; Katogi, Kouzou; Igarashi, Osamu; Suda, Seiji; Tokuyama, Keiichi; and Yamamura, Hirohisa, to Hitachi, Ltd. Liquid crystal display device. 4,708,440, Cl. 350-339.00F.
Kuhling, Franz, to Hasco Normalien Hasenclever & Co. Adjustable marking device for use in mold wall. 4,708,314, Cl. 249-103.000.
Kuhlmann, George E.: *See*—
Spanswick, James; and Kuhlmann, George E., 4,709,080, Cl. 560-86.000.
Kukes, Simon G.: *See*—
Howell, Jerald A.; and Kukes, Simon G., 4,708,784, Cl. 208-112.000.
Kulesza, Ralph J.; Wozniak, Walter J.; and Disko, Harry, to Marvin Glass & Associates. Toy mechanical monster. 4,708,690, Cl. 446-351.000.
Kulla, Hans; Lehky, Pavel; and Squaratti, Armand, to Lonza Ltd. Process for the continuous production of L-carnitine. 4,708,936, Cl. 435-128.000.
Kume, Tadaaki: *See*—
Koike, Mitsuhiro; Saijo, Yoshihiro; and Kume, Tadaaki, 4,708,707, Cl. 493-313.000.
Kun, Judit: *See*—
Heja, Gergely; Korbonits, Dezso ; Palosi, Endre; Kiss, Pal; Gonczi, Csaba; Szvoboda nee Kanzel, Ida; Marvanyos, Ede; Kun, Judit; Szomor nee Wundele, Maria; Szabo, Gabor; Kallay, Tamas; and Ledniczky, Laszlo , 4,709,081, Cl. 560-100.000.
Kuna, Wayne A.: *See*—
Zaruba, John V.; Hanson, Steven P.; and Kuna, Wayne A., 4,708,348, Cl. 273-246.000.

Kung, Patrick C.; and Goldstein, Gideon, to Ortho Pharmaceutical Corporation. Monoclonal antibody to human suppressor T cells. 4,709,015, Cl. 530-387.000.

Kuni, Asahiro: *See—*
Komeyama, Yoshihiro; Kembo, Yukio; Kuni, Asahiro; Funatsu, Ryuuichi; Inagaki, Akira; Ikeda, Minoru; and Okamoto, Keiichi, 4,708,484, Cl. 356-401.000.

Kunkel, Fred; and Rebel, Herbert, to M.A.N.-Roland Druckmaschinen Aktiengesellschaft. Mechanism for accurate register alignment of a blanket on a blanket or plate cylinder. 4,707,902, Cl. 29-417.000.

Kuoni, Xaver, to C.E.T. Construction Eng'g. & Technology Ltd. Apparatus for the endless projection of a cinematographic film. 4,708,447, Cl. 352-128.000.

Kurahashi, Yoshio; Shiokawa, Kozo; Goto, Toshio; Kagabu, Shinzo; Matsumoto, Noboru; and Moriya, Koichi, to Nihon Tokushu Noyaku Seizo K.K. Salicylamide derivatives. 4,708,953, Cl. 514-166.000.

Kuraoka, Hiroaki, to Nippondenso Co., Ltd. Method and apparatus for controlling heater of a gas sensor. 4,708,777, Cl. 204-1.00T.

Kuraray Co., Ltd.: *See—*
Maruyama, Hitoshi; Ono, Isao; Kohno, Hiroji; Yamauchi, Junnosuke; and Okaya, Takuji, 4,708,947, Cl. 503-209.000.

Kurata, Masami: *See—*
Takahashi, Haruhiko; Inui, Toshiharu; Saitoh, Hiroyuki; Ishikawa, Noriyoshi; Funato, Hitoshi; Ohmori, Takashi; Kurata, Masami; and Katou, Yasuo, 4,709,149, Cl. 250-317.100.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,708,950, Cl. 514-42.000.

Kuriyama, Keiichi; Miura, Kenichiro; and Deguchi, Takashi, to Matsushita Electric Industrial Co., Ltd. Trouble detector apparatus for an air-conditioner including a counter and a timer. 4,709,292, Cl. 361-22.000.

Kussel, Willy: *See—*
Trox, Uwe; and Kussel, Willy, 4,708,394, Cl. 299-1.000.

Kuwabara, Shinichiro, to Sony Corporation. Optical modulation system. 4,709,417, Cl. 455-611.000.

Kyocera Corporation: *See—*
Ogawa, Motokazu; Nishiguchi, Yasuo; and Minami, Keijiro, 4,708,915, Cl. 428-698.000.

Kyowa Hakko Kogyo Co., Ltd.: *See—*
Hirata, Tadashi; Matsukuma, Ikuo; Yoshiie, Shigeo; Sato, Kiyoshi; and Ohashi, Yoichi, 4,708,956, Cl. 514-210.000.

L. & C. Steinmuller GmbH: *See—*
Keintzel, Gunter; and Westebbe, Klaus, 4,708,093, Cl. 122-483.000.

L. R. Nelson Corporation: *See—*
Bruninga, Kenneth J., 4,708,264, Cl. 222-20.000.

La Telemecanique Electrique: *See—*
Baurand, Gilles; Fouret, Rene ; and Rundsztuk, Marek, 4,709,205, Cl. 324-127.000.

Labaune, Jean-Pierre; and Essin, Pierre B., to Albert Rolland, S.A. Novel aroylpyrroles, their production and their use in immunologic therapy. 4,709,051, Cl. 548-533.000.

Labconco Corporation: *See—*
Hambleton, Larry G.; Sears, Claude L.; and Offutt, Elmer B., 4,708,153, Cl. 134-170.000.

Labedan, Jean-Denis; and Merle, Michel, to Nadella. Locally prestressed rolling bearing for mounting on a shaft in a lateral direction. 4,708,498, Cl. 384-560.000.

Labombarde, Raymond A.; and Tremblay, Robert A., to International Paper Box Machine Co. Apparatus for packaging box flats. 4,707,970, Cl. 53-529.000.

LaBrie, James J.: *See—*
Shimkunas, Alexander R.; and LaBrie, James J., 4,708,919, Cl. 430-5.000.

Labuc, Vladimir M.: *See—*
Kitzinger, Frank; and Labuc, Vladimir M., 4,708,495, Cl. 374-154.000.

Lace, Melvin A.: *See—*
Bellet, Richard J.; Broyer, Sol raim; Bekker, Alex Y.; and Lace, Melvin A., 4,708,839, Cl. 264-85.000.

LaCount, Kenneth H., to Cooper Industries. Separable lifting hook. 4,708,382, Cl. 294-82.100.

Ladney, Michael, Jr.: *See—*
Loren, Norman S., 4,708,398, Cl. 301-37.0PB.

Ladriere, Serge. Projectiles intended to be fired by a fire-arm. 4,708,063, Cl. 102-516.000.

Lagache, Remi-Louis: *See—*
Vandeweghe, Michel M. J.; Victoor, Johnny-Fredy-Maurice; and Lagache, Remi-Louis, 4,708,174, Cl. 139-448.000.

Lagadec, Roger, to Willi Studer AG. Method and apparatus for producing and selectively equalizing a temporal relationship between series of dipital signals. 4,709,278, Cl. 360-26.000.

L'Air Liquide: *See—*
Desprez, Marc; and Roux, Michel, 4,708,728, Cl. 65-136.000.

Lajoie-Mazenc, Michel: *See—*
Banon, Louis; Lajoie-Mazenc, Michel; and Mathieu, Pierre, 4,709,179, Cl. 310-156.000.

Laker, Edward B. Reedmaking system, methodology, and component tools. 4,708,182, Cl. 144-369.000.

Lam, Albert. Electric wire connector for coaxial cable. 4,708,414, Cl. 439-394.000.

Lamb, Charles G.; and McMurtrie, Andrew, to Brown & Williamson Tobacco Corporation. Cigarette filter. 4,708,150, Cl. 131-336.000.

Lambelet, Jose A. Method of facilitating the covering of large surfaces. 4,708,755, Cl. 156-64.000.

Lamblin, Jean-Michel: *See—*
Gommier, Herve ; and Lamblin, Jean-Michel, 4,708,898, Cl. 428-36.000.

Lamont, Jason B.: *See—*
So, Vincent C.; Hughes, Richard P.; Vella, Paul J.; and Lamont, Jason B., 4,708,476, Cl. 356-73.100.

Lampe, Lutz: *See—*
Wenske, Hanno; Gallien, Arnold; Kauschinger, Martin; Unger, Klaus; Brendel, Josef; and Lampe, Lutz, 4,709,182, Cl. 310-316.000.

Lamphere, Jack C.: *See—*
Stanley, Frederick W., Jr.; Lamphere, Jack C.; and Chonde, Yohannes, 4,708,997, Cl. 526-207.000.

Landis, Dwight A. Liquid water content analyzer. 4,708,013, Cl. 73-23.100.

Landis, Richard C., to ITT Gallium Arsenide Technology Center, a division of ITT Corporation. Jumper for a semiconductor assembly. 4,709,300, Cl. 361-398.000.

Lane, Philip S., to SpaceLabs, Inc. Apparatus and method for impedance pneumography. 4,708,146, Cl. 128-723.000.

Lang, Aage, to Clean-Tex A/S. Method of providing nap map or carpet of washable type having increased liquid removal therefrom during washing thereof. 4,707,895, Cl. 28-107.000.

Langdon, Michael J., to Xerox Corporation. Simultaneous transfer and fusing in electrophotography. 4,708,460, Cl. 355-10.000.

Lange, Jurgen, to VDO Adolf Schindling AG. Linear motor. 4,709,183, Cl. 310-328.000.

Langenberg, Anthony J.; Chu, Pak-Jong; Moss, John S.; and Collar, Geoffrey A., to Northern Telecom Limited. Telephone hook switch with elastomeric contact member. 4,709,389, Cl. 379-424.000.

LaRosa, Thomas. Protective automobile partition. 4,708,384, Cl. 296-24.00R.

Larsen, Bent A.: *See—*
Godtfredsen, Sven E.; Ottesen, Martin; and Larsen, Bent A., 4,708,875, Cl. 426-12.000.

Larsen, Olaf E., to Phillips Petroleum Company. Pipe plug apparatus and method for its use. 4,708,841, Cl. 264-558.000.

Larson, Curtis L.: *See—*
Emslander, Jeffrey O.; and Larson, Curtis L., 4,708,249, Cl. 206-630.000.

Larson, James R., to Holaday Circuits, Inc. Loading system. 4,709,207, Cl. 324-158.00F.

Larsson, Lars-Ake L.; Nilsson, Ake W.; Johannson, Bo Ingemar W.; and Naucler, Lars Olof V., to Gambro Lundia AB. Apparatus for the separation of fractions from body fluids. 4,708,714, Cl. 604-5.000.

LaRussa, Joseph A.; and Shenker, Martin, to Farrand Optical Co., Inc. Optical visual simulation system. 4,708,438, Cl. 350-174.000.

Lasley, Duncan T.: *See—*
Austin, Forrest L.; and Lasley, Duncan T., 4,708,155, Cl. 137-1.000.

Lasser, Cliff A.: *See—*
Hillis, W. Daniel; Knight, Thomas F., Jr.; Bawden, Alan; Kahle, Brewster L.; Chapman, David; Christman, David P.; Lasser, Cliff A.; and Feynman, Carl R., 4,709,327, Cl. 364-200.000.

Latimer N.V.: *See—*
Garcia Cascajosa, Felix, 4,707,978, Cl. 60-39.350.

Lau, Kenneth K.; and Yelf, Jack T., to MacMillan Bloedel Limited. Temperature compensating continuous panel tester. 4,708,020, Cl. 73-852.000.

Lau, Kreisler S. Y.; and Kelleghan, William J., to Hughes Aircraft Company. Polymers of ethynylthiophenoxy derivatives of diphenylhexafluoropropane. 4,708,991, Cl. 525-275.000.

Laugier, Noel: *See—*
Berthet, Hubert; and Laugier, Noel, 4,708,526, Cl. 405-202.000.

Laurent, Henry: *See—*
Hofmeister, Helmut; Annen, Klaus; Laurent, Henry; and Wiechert, Rudolf, 4,708,823, Cl. 260-397.400.

Laurien, Hanno: *See—*
Sundermann, Erich; Laurien, Hanno; Vahlbrauk, Wolfgang; and Reye, Hans, 4,708,642, Cl. 432-95.000.

Lavoie, Fernand; and Lepine, Yves. Forearm shield pad. 4,707,861, Cl. 2-16.000.

Lawall, Thomas R.; and Lukacz, Stephen A., to Fuller Company. Apparatus for roasting fine grained material. 4,708,644, Cl. 432-106.000.

Leach, Douglas R., to Hercules Incorporated. Cycloolefin composition and method for making high TG fiber reinforced polymeric product. 4,708,969, Cl. 521-82.000.

Leary, Timothy G.: *See—*
Donegan, Thomas E.; and Leary, Timothy G., 4,709,021, Cl. 540-141.000.

Lechner, Bernard J.; and Powers, Kerns H., to RCA Corporation. Wide screen composite video signal encoder and standard aspect ratio decoder having burst and subcarrier components of different frequencies. 4,709,256, Cl. 358-11.000.

Lecolier, Serge: *See—*
Tkatchenko, Igor; Jaouhari, Rabih; Bonnet, Michel; Dawkins, Gordon; and Lecolier, Serge, 4,709,087, Cl. 560-339.000.

Lederman, Frederick E., to General Motors Corporation. Unitized bearing with free molded seals. 4,708,497, Cl. 384-448.000.

Ledniczky, Laszlo : *See—*
Heja, Gergely; Korbonits, Dezso ; Palosi, Endre; Kiss, Pal; Gonczi, Csaba; Szvoboda nee Kanzel, Ida; Marvanyos, Ede; Kun, Judit; Szomor nee Wundele, Maria; Szabo, Gabor; Kallay, Tamas; and Ledniczky, Laszlo , 4,709,081, Cl. 560-100.000.

Lee, Chung-Cheng. Skiing toy. 4,708,688, Cl. 446-288.000.

Lee, George E.: *See—*
Lee, Thomas B. K.; and Lee, George E., 4,709,093, Cl. 564-220.000.

Lee, James. Simple device for the actuation of an animal-shaped toy. 4,708,025, Cl. 74-44.000.

Lee, Thomas B. K.; and Lee, George E., to Hoechst-Roussel Pharmaceuticals Inc. Method for the preparation of 4-phenyl-1,3-benzodiazepines and precursors thereof. 4,709,093, Cl. 564-220.000.

Leen, Kee K. L. S.; and Chang, Jin R., to Centre de Recherche Industrielle du Quebec. Process for preparing a crystalline iron-borosilicate. 4,708,857, Cl. 423-277.000.

LeFever, Robin E.: *See—*
Krolick, Robert S.; Storey, James S.; and LeFever, Robin E., 4,708,592, Cl. 416-176.00A.

Legaignoux, Bruno T.: *See—*
Legaignoux, Dominique M.; and Legaignoux, Bruno T., 4,708,078, Cl. 114-102.000.

Legaignoux, Dominique M.; and Legaignoux, Bruno T. Propulsive wing with inflatable armature. 4,708,078, Cl. 114-102.000.

Leger, Alain A., to Etablissement Public de Diffusion dit Telediffusion de France. Matrix transcoding system in videotext systems. 4,709,232, Cl. 340-731.000.

le Granse, Josephus N., to Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V. Outlet nipple for dispensers of beverage concentrates. 4,708,263, Cl. 222-1.000.

Le Helloco, Michel: *See—*
Desfontaines, Guy; and Le Helloco, Michel, 4,708,843, Cl. 376-219.000.

Lehky, Pavel: *See—*
Kulla, Hans; Lehky, Pavel; and Squaratti, Armand, 4,708,936, Cl. 435-128.000.

Lehmann, Roger W.; and Satten, Michael I. Toy car carrier. 4,708,683, Cl. 446-75.000.

Leifeld, Ferdinand; and Teichmann, Paul, to Trutzschler GmbH & Co. KG. Apparatus for detecting foreign bodies, such as pieces of metal or the like, in textile fiber bales. 4,707,887, Cl. 19-0.200.

Leigh-Monstevens, Keith V., to Automotive Products plc. Bearing support for motor vehicle clutch control apparatus. 4,708,228, Cl. 192-85.0CA.

Lekhtman, David. Water sport equipment. 4,708,076, Cl. 114-39.200.

Leland Stanford Junior University, The Board of Trustees of the: *See—*
Desurvire, Emmanuel; Digonnet, Michel J. F.; and Shaw, H. J., 4,708,421, Cl. 350-96.150.

Lemaire, Frederic, to Thomson-CSF. Differential current amplifier. 4,709,217, Cl. 330-258.000.

Lengsfeld, Wolfgang: *See—*
Merger, Franz; Hutmacher, Hans-Martin; Hettinger, Peter; Voges, Dieter; and Lengsfeld, Wolfgang, 4,709,072, Cl. 558-450.000.

Lenhardt, Karl, to Lenhardt Maschinenbau GmbH. Apparatus for joining two panes of glass to form a fused space window pane. 4,708,762, Cl. 156-556.000.

Lenhardt Maschinenbau GmbH: *See—*
Lenhardt, Karl, 4,708,762, Cl. 156-556.000.

Lentz, M. Rigdon, to Anisa Medical, Inc. Method and system for removing immunosuppressive components from the blood of mammals. 4,708,713, Cl. 604-5.000.

Lepine, Yves: *See—*
Lavoie, Fernand; and Lepine, Yves, 4,707,861, Cl. 2-16.000.

Leppanen, Jarmo, to Oy Tampella Ab. Apparatus for storing a concrete feeding hose in a rock bolting device. 4,708,532, Cl. 405-303.000.

Leppanen, Jarmo, to Oy Tampella AB. Method and a device for guiding a concrete feeding hose in connection with the grout feed in rock bolting. 4,708,533, Cl. 405-303.000.

Lerk, Coenraad F.: *See—*
De Haan, Pieter; Lerk, Coenraad F.; and Schoonen, Adelbert J. M., 4,708,874, Cl. 424-470.000.

Leshuk, Daniel J.: *See—*
Siegal, Burton L.; and Leshuk, Daniel J., 4,708,260, Cl. 220-465.000.

Lesiak, P. Dieter: *See—*
Tischer, Kurt M.; Schlipf, Michael; Lesiak, P. Dieter; and Wengert, Rolf, 4,708,678, Cl. 445-24.000.

Lessard, Philip A.; and Smith, Marshall J., to Helix Technology Corporation. High pressure stepped clearance seal valve in a cryogenic refrigeration system. 4,708,165, Cl. 137-509.000.

L'Etat Francais: *See—*
Gain, Robert; Simon, Jacques; Pasturel, Andre ; and Roger, Marc, 4,708,836, Cl. 264-40.100.

L'Etat Francais represente par le Delegue General pour l'Armement: *See—*
Balquet, Robert; Baubeau, Robert; Bertrand, Jean-Paul; Guezou, Jean-Pierre; and Carron, Philippe, 4,708,077, Cl. 114-67.00A.

Levavi, Shmuel. Human powered vehicles and mechanism particularly useful therein. 4,708,356, Cl. 280-255.000.

Lever Brothers Company: *See—*
Bewn, Brian; Critchley, Peter; Durrant, James A.; Stebles, Malcolm R. D.; and Tipping, Leigh R. H., 4,708,863, Cl. 424-47.000.

Leviton Manufacturing Company, Inc.: *See—*
Gershen, Bernard; Rosenbaum, Saul; and Pearse, James N., 4,709,293, Cl. 361-50.000.

Levy, Roland A.: *See—*
Chandross, Edwin A.; Dean, Robert E.; Gallagher, Patrick K.; Levy, Roland A.; Schrey, Frank; and Smolinsky, Gerald, 4,708,884, Cl. 427-39.000.

Lewin, Ian: *See—*
Heinisch, Richard V.; and Lewin, Ian, 4,709,312, Cl. 362-298.000.

Lewis, Albert, to Glass Incorporated International. Nickel/chrome base superalloys. 4,708,848, Cl. 420-585.000.

Leydorf, George F., Jr.; and Pulick, Michael A., to Ford Motor Company. Chamber construction for internal combustion engine. 4,708,105, Cl. 123-193.0CH.

Li, Gabriel M. Y., to National Semiconductor Corp. Subnanosecond programmable phase shifter for a high frequency digital PLL. 4,709,170, Cl. 307-511.000.

Liang, Yeon F., to Phillips Petroleum Company. Arylene sulfide polymers of improved impact strength. 4,708,983, Cl. 525-101.000.

Liddiard, Kevin, to Commonwealth of Australia, The. Focal plane scanning device. 4,708,420, Cl. 350-6.600.

Liebel, Henry L., to Signode Paper Products Company. Slip sheet. 4,708,247, Cl. 206-501.000.

Lieberman, Robert A.: *See—*
Forrest, Stephen R.; Lieberman, Robert A.; and Panock, Richard L., 4,709,413, Cl. 455-606.000.

Liebert Corporation: *See—*
Gephart, Don A.; and Powell, Jeffrey M., 4,709,318, Cl. 363-37.000.

Lien, Charles, to Venus Scientific Inc. Buck-boost parallel resonant converter with inductive energy recovery circuit. 4,709,323, Cl. 363-97.000.

Liesch, Jean: *See—*
Melan, Corneille; and Liesch, Jean, 4,708,562, Cl. 414-10.000.

Ligasacchi, Sergio: *See—*
Graziadio, Mario; and Ligasacchi, Sergio, 4,708,293, Cl. 239-427.000.

Lignes Telegraphiques et Telephoniques Ltt: *See—*
Gouali, Mohamed; Roullet, Gerald; and Voisin, Oliver, 4,708,425, Cl. 350-96.160.

Ligon, James T. Washer cutting apparatus. 4,708,624, Cl. 425-306.000.

Liimatainen, Heikki: *See—*
Rautakorpi, Paavo; Manttari, Risto; Liimatainen, Heikki; Pernu, Heikki; Tuomainen, Heikki; and Rusanen, Hannu, 4,708,011, Cl. 73-63.000.

Lilja, Launo L.: *See—*
Honkaniemi, Matti E.; Mustikka, Lauri A.; Jankkila, Martti J.; Hokkanen, Pentti O.; Heikkila, Risto M.; and Lilja, Launo L., 4,708,640, Cl. 432-14.000.

Lim Kunststoff Technologie Gesellschaft m.b.H.: *See—*
Schmidt, Oskar; and Kubica, Wladislaw, 4,708,187, Cl. 152-530.000.

Lin, Henry C.: *See—*
Cotter, Byron R.; Lin, Henry C.; and Pawlak, Joseph A., 4,709,056, Cl. 549-246.000.

Lin, Jinn-Pin. Multi-function pad device with driving mechanism. 4,708,676, Cl. 441-67.000.

Lin, Shaw-Wen: *See—*
Roche, Joseph R.; and Lin, Shaw-Wen, 4,708,513, Cl. 403-361.000.

Lindell, Edvin. Method in the installation of piles and apparatus for carrying out the method. 4,708,529, Cl. 405-240.000.

Lindquist, Craig B.; and Bihn, Robert F., to Kent-Moore Corporation. Connector test adapter. 4,708,667, Cl. 439-788.000.

Lindsey, Keith E., to Lindsey Manufacturing Company. Strain insulator with arcing horns. 4,709,125, Cl. 174-140.00S.

Lindsey Manufacturing Company: *See—*
Lindsey, Keith E., 4,709,125, Cl. 174-140.00S.

Lingertat, Helmut: *See—*
Buljan, Sergei-Tomislav V.; Lingertat, Helmut; Baldoni, J. Gary, II; and Sarin, Vinod K., 4,708,037, Cl. 82-1.00C.

Linke, Udo: *See—*
Boden, Karl; Ibach, Harald; and Linke, Udo, 4,708,764, Cl. 156-617.00R.

Linner, John G.; and Livesey, Stephen, to Board of Regents, The University of Texas, The. Apparatus and method for ultrarapid cooling of biological samples. 4,707,998, Cl. 62-349.000.

Liposome Company, Inc., The: *See—*
Popescu, Mircea C.; Weiner, Alan L.; and Carpenter-Green, Sharon S., 4,708,861, Cl. 424-1.100.

Lisser, Jacques: *See—*
van de Klundert, Louis J. M.; ten Kate, Herman H. J.; Sikkenga, Jan; Groenenboom, Maarten; and Lisser, Jacques, 4,709,314, Cl. 363-14.000.

Little Giant Crane and Shovel, Inc.: *See—*
Heckman, Glenard W., 4,708,066, Cl. 105-215.200.

Little, John D.; Little, Lorianne C.; and Wood, John. Method for making fabric roses. 4,708,893, Cl. 428-26.000.

Little, Lorianne C.: *See—*
Little, John D.; Little, Lorianne C.; and Wood, John, 4,708,893, Cl. 428-26.000.

Liu, Jackson. Pneumatic pressure gauge. 4,708,169, Cl. 137-557.000.

Liu, Yaguang. Therapeutic composition from plant extracts. 4,708,949, Cl. 514-26.000.

Livermore, Frederick C.: *See—*
Hung, Francis Y.; and Livermore, Frederick C., 4,709,296, Cl. 361-102.000.

Livesey, Stephen: *See—*
Linner, John G.; and Livesey, Stephen, 4,707,998, Cl. 62-349.000.

Llinares, Michel: *See—*
Grangette, Henri; Llinares, Michel; Bornand, Bernard; and Faure, Alain, 4,708,720, Cl. 44-51.000.

LMT Radio Professionnelle: *See—*
Poullain, Michel; and Marcuard, Alain, 4,709,237, Cl. 342-203.000.

Loadmaster Systems, Inc.: *See—*
Nunley, C. Lynn; and Tomaselli, Joe W., 4,707,961, Cl. 52-408.000.

Lockheed Missiles & Space Company, Inc.: *See—*
Bordenave, John R. P., 4,709,240, Cl. 343-772.000.

Lockwood, Hanford N., Jr., to NEA Technologies, Inc. Pulse combustion energy system. 4,708,159, Cl. 137-340.000.

Locotos, Frank M., to F. M. Locotos Co., Inc. Reinforcing washer for a mine roof bolt assembly. 4,708,559, Cl. 411-545.000.

Loctite Corporation: *See*—
Ruesch, Merlin R., 4,708,270, Cl. 222-386.500.

Lodetti, Attilio; and Tobler, Karl, to AG fur industrielle Elektronik AGIE. Apparatus for severing a strip-like or wire-like electrode of a spark erosion machine. 4,709,130, Cl. 219-69.00W.

Loebel, Klaus D., to Schering Aktiengesellschaft. Injection solution. 4,708,957, Cl. 514-264.000.

Loeffler, Herbert; and Preiner, Peter, to Siemens Aktiengesellschaft. Light waveguide connector. 4,708,428, Cl. 350-96.200.

Loftin, Rayford A., to Magnavox Government and Industrial Electronic Company. End weighted reed sound transducer. 4,709,359, Cl. 367-155.000.

Lofton, Thomas S., Jr.: *See*—
Reid, Philip L.; and Lofton, Thomas S., Jr., 4,708,242, Cl. 206-257.000.

Lonati, Francesco, to Lonati S.p.A. Circular knitting machine incorporating a device for setting to work knitting cams, in particular for hose knitting. 4,708,002, Cl. 66-40.000.

Lonati S.p.A.: *See*—
Lonati, Francesco, 4,708,002, Cl. 66-40.000.

London & Scandinavian Metallurgical Co. Limited: *See*—
Kellie, James L. F.; and Cowell, Andrew J. J., 4,708,739, Cl. 75-76.000.

Long, Don W.: *See*—
Los, Marinus; Long, Don W.; and Withers, Gregory P., 4,709,036, Cl. 546-167.000.

Long, John E.: *See*—
Donovan, Dennis; McDonnell, Michael L.; Weigel, Gerald C.; and Long, John E., 4,708,877, Cl. 426-69.000.

Long, John V.; and Gagliani, John, to Imi-Tech Corporation. Steam resistant modified polyimide foams. 4,708,972, Cl. 521-185.000.

Lonza Ltd.: *See*—
Kulla, Hans; Lehky, Pavel; and Squaratti, Armand, 4,708,936, Cl. 435-128.000.

Loomans, Maurice E.; Matthews, Randall S.; and Miller, Joseph A., to Procter & Gamble Company, The. Novel anti-inflammatory agents, pharmaceutical compositions and methods for reducing inflammation. 4,708,966, Cl. 514-689.000.

Lopez-Mota, Ricardo: *See*—
Cardenas-Franco, Luis; and Lopez-Mota, Ricardo, 4,708,729, Cl. 65-164.000.

Loral Corporation: *See*—
Crapanzano, Angelo T., 4,709,223, Cl. 340-52.00B.
Graham, John J., Jr.; Huber, Joseph C., Jr.; and Neumann, John E., 4,709,235, Cl. 342-10.000.

Loren, Norman S., to Ladney, Michael, Jr. Wheel cover retention system with pilot ribs. 4,708,398, Cl. 301-37.0PB.

Lorenz, Robert D., to Rexnord Inc. Optical measuring apparatus and method. 4,708,483, Cl. 356-376.000.

Los, Marinus; Long, Don W.; and Withers, Gregory P., to American Cyanamid Company. Process for the preparation of herbicidal 2-(4,4-disubstituted-5-oxo-2-imidazolin-2-yl)benzoic, nicotinic and quinoline-3-carboxylic acids, esters and salts. 4,709,036, Cl. 546-167.000.

Loser, Norbert; Tilgner, Leopold; and Scholer, Jurgen, to SKF Gleitlager GmbH. Pivot bearing for steering columns of motor vehicles. 4,708,499, Cl. 384-539.000.

Lotz, Werner: *See*—
Bathelt, Heinrich; Ehrl, Winfried; Wehowsky, Frank; Kleber, Rolf; Lotz, Werner; Glenz, Wolfgang; Herdt, Hubert; Jackel, Lothar; Mast, Jan-Hilbert; Hintermeier, Karl; and Muller, Manfred, 4,709,074, Cl. 560-33.000.

Low, Jim Y., to Phillips Petroleum Company. Upgrading carbonaceous materials. 4,708,788, Cl. 208-390.000.

LSI Logic Corporation: *See*—
Pasch, Nicholas F., 4,708,770, Cl. 156-662.000.

Lubinsky, Anthony R.: *See*—
Cowan, Carl E.; Lubinsky, Anthony R.; Nylund, Thomas W.; Specht, Malcolm R.; and Spence, John P., 4,708,459, Cl. 355-4.000.

Lubrizol Corporation, The: *See*—
Davis, Kirk E., 4,708,809, Cl. 252-33.400.
Forsberg, John W., 4,708,753, Cl. 149-2.000.

Ludwig, Clifford J.; and Delia, Anthony D., to Drackett Company, The. Dispenser with fluid pathway including valve to form air lock. 4,707,865, Cl. 4-228.000.

Luger, Wolfgang: *See*—
Nagl, Michael; Fugger, Gerhard; Mraz, Jaroslav; Mailander, Horst; Rottenmanner, Ernst; Rauber, Norbert; and Luger, Wolfgang, 4,708,643, Cl. 432-95.000.

Luitje, William V., to Chrysler Motors Corporation. Time of day clock. 4,708,491, Cl. 368-156.000.

Luk Lamellen und Kupplungsbau GmbH: *See*—
Maucher, Paul, 4,708,230, Cl. 192-98.000.

Lukacz, Stephen A.: *See*—
Lawall, Thomas R.; and Lukacz, Stephen A., 4,708,644, Cl. 432-106.000.

Lumma, William C., Jr.: *See*—
Erhardt, Paul W.; Hagedorn, Alfred A., III; Lumma, William C., Jr.; and Wohl, Ronald A., 4,709,043, Cl. 548-318.000.

Lundback, Stig, to Astra-Tech Aktiebolag. Holder fixed by vacuum for industrial use. 4,708,381, Cl. 294-64.100.

Lunke, Manfred: *See*—
Walter, Jurgen; Falz, Ulrich; and Lunke, Manfred, 4,708,514, Cl. 403-372.000.

Luo, Jih-Tzang, to Industrial Technology Research Institute. Two-stroke engine with injected fuel gasifying chamber in piston. 4,708,100, Cl. 123-73.0PP.

Luterek, Garry M., to Deere & Company. Combined engine cooling and lube system. 4,708,095, Cl. 123-41.420.

Lux, Peter: *See*—
Metzdorff, Walter; Lux, Peter; and Eibert, Max, 4,708,473, Cl. 356-5.000.

Lynch, Marine D.: *See*—
Wing, Ray D.; Lynch, Marine D.; Rawitzer, John A.; and Whitney, Mark D., 4,708,451, Cl. 354-312.000.

Lynch, Michael J.: *See*—
Forehand, Gilbert H.; Lynch, Michael J.; Duncan, Richard L.; Tilghman, Stephen E.; and Penn, Jack C., 4,709,234, Cl. 340-856.000.

Lyons, John C.: *See*—
Jhabvala, Murzban D.; Dargo, David R.; and Lyons, John C., 4,709,252, Cl. 357-30.000.

M.A.N.-Roland Druckmaschinen Aktiengesellschaft: *See*—
Kunkel, Fred; and Rebel, Herbert, 4,707,902, Cl. 29-417.000.

Ma, John Y.; and Wu, Leo. TVRO receiver with surface mounted high frequency voltage-controlled oscillator. 4,709,409, Cl. 455-325.000.

Mabuchi, Akira; and Jinushi, Shinji, to Toyoda Gosei Co., Ltd. Ornamental and protective molding. 4,708,894, Cl. 428-31.000.

MacCallum, Gregory J.: *See*—
Peters, Albert W.; and MacCallum, Gregory J., 4,708,787, Cl. 208-130.000.

Macchiarulo, Vincenzo; and Fiordaliso, Carlo, to Pirelli Transmissioni Industriali S.p.A. V-belt for continuous speed variators. 4,708,703, Cl. 474-268.000.

MacDuff, Robert B.: *See*—
Patterson, John F.; MacDuff, Robert B.; and Yates, Jack, 4,708,846, Cl. 376-444.000.

MacFall, James R.; and Glover, Gary H., to General Electric Company. Method of enhancing image signal-to-noise ratio by combining NMR images of differing pulse sequence timing. 4,709,212, Cl. 324-309.000.

Machida, Yoshio; and Kasugai, Takao, to Kabushiki Kaisha Toshiba. Nuclear magnetic resonance system. 4,709,211, Cl. 324-309.000.

Mack, Gregory: *See*—
Martinez, Kenneth; and Mack, Gregory, 4,709,377, Cl. 375-75.000.

Macke, Wilfried: *See*—
Siegers, Hans-Peter; and Macke, Wilfried, 4,708,900, Cl. 428-74.000.

MacMillan Bloedel Limited: *See*—
Lau, Kenneth K.; and Yelf, Jack T., 4,708,020, Cl. 73-852.000.

Madamba, O. Mark: *See*—
Brown, Wallace L.; and Madamba, O. Mark, 4,708,048, Cl. 89-1.805.

Mae, Masataka: *See*—
Saito, Shigeki; Hosokawa, Takao; and Mae, Masataka, 4,708,885, Cl. 427-58.000.

Maebayashi, Jiro; and Hamamoto, Masaya, to Mazda Motor Corporation. Open top type automobile body structure. 4,708,389, Cl. 296-107.000.

Maehara, Toshifumi, to Akebono Brake Industry Co., Ltd. Anti-lock brake system for vehicle. 4,708,407, Cl. 303-116.000.

Mage, Allen B. Three dimensional display device folded from a single sheet of material. 4,708,911, Cl. 428-542.800.

Magerlein, Helmut: *See*—
Diamantoglou, Michael; Magerlein, Helmut; Brodowski, Walter; Grimm, Wolfgang; and Meyer, Gerhard, 4,708,985, Cl. 525-166.000.

Magnan, Jeffrey J., to Gaastra Sails International Ltd. Flex wing apparatus with resilient couplings. 4,708,079, Cl. 114-103.000.

Magnavox Government and Industrial Electronic Company: *See*—
Loftin, Rayford A., 4,709,359, Cl. 367-155.000.

Magneti Marelli S.p.A.: *See*—
Carducci, Carlo, 4,707,876, Cl. 15-250.230.

Magnum Piering, Inc.: *See*—
Rippe, Dondeville M., 4,708,528, Cl. 405-230.000.

Mai, Khuong H. X.; and Patil, Ghanshyam, to Du Pont de Nemours, E. I., and Company. Process for the preparation of 2-(1-hydroxyalkyl)-5,5-diphenylhydantoin. 4,709,042, Cl. 548-312.000.

Maignan, Jean: *See*—
Shroot, Braham; and Maignan, Jean, 4,708,959, Cl. 514-373.000.

Mailander, Horst: *See*—
Nagl, Michael; Fugger, Gerhard; Mraz, Jaroslav; Mailander, Horst; Rottenmanner, Ernst; Rauber, Norbert; and Luger, Wolfgang, 4,708,643, Cl. 432-95.000.

Main, William E., to Motorola, Inc. Current limiter and method for limiting current. 4,709,171, Cl. 307-567.000.

Mainville, Jack. Welding apparatus for simultaneously applying parallel welds to workpieces. 4,709,133, Cl. 219-125.100.

Makela, Markku, to Velsa Oy. Drive bogie for a crawler vehicle and a crawler mat for use therewith. 4,708,218, Cl. 180-9.500.

Maki, Voldi E., Jr., to Gearhart Industries, Inc. Method and apparatus for acoustically investigating a borehole casing cement bond. 4,709,357, Cl. 367-35.000.

Makino, Katsumi, to Mitsubishi Denki Kabushiki Kaisha. Lighting device for an elevator. 4,709,308, Cl. 362-148.000.

Makino, Tetsuo: *See*—
Fujiwara, Haruyoshi; Makino, Tetsuo; and Iwata, Hiroshi, 4,708,773, Cl. 162-300.000.

Mallinckrodt, Inc.: *See*—
Dolfini, Joseph E.; and Glinka, Jerome, 4,709,098, Cl. 568-491.000.

Maloney, Timothy R.; Patterson, David E.; and Aseltine, Richard J., to Chevron Research Company. Intermittent oil well gas-lift apparatus. 4,708,595, Cl. 417-109.000.

Manley, Paul W., to G. D. Searle & Co. 6-(imidazolyphenyl)-4-iminopyrimidinones useful as hypotensive agents. 4,708,958, Cl. 514-274.000.

Mann, David O., to Mann Technology Limited Partnership. Apparatus and method for treating air from a turbocharger. 4,708,120, Cl. 123-563.000.

Mann Technology Limited Partnership: *See*—
Mann, David O., 4,708,120, Cl. 123-563.000.

Mannesmann AG: *See*—
Heidemann, Wolfgang, 4,708,328, Cl. 266-281.000.

Manttari, Risto: *See*—
Rautakorpi, Paavo; Manttari, Risto; Liimatainen, Heikki; Pernu, Heikki; Tuomainen, Heikki; and Rusanen, Hannu, 4,708,011, Cl. 73-63.000.

Manukian, Artashes R.: *See*—
Mkhikian, Robert M.; Shaginian, Suren G.; Markarian, Temur G.; Khaidukov, Georgy K.; Velidzhanian, Sofia V.; Manukian, Artashes R.; Karapetian, Artur K.; Kazarian, Aram V.; and Airapetian, Robert R., 4,708,628, Cl. 425-406.000.

Marathon Oil Company: *See*—
Tackett, James E., 4,708,205, Cl. 166-273.000.

Marcuard, Alain: *See*—
Poullain, Michel; and Marcuard, Alain, 4,709,237, Cl. 342-203.000.

Mareck B.V.: *See*—
Vergne, Bernard, 4,708,634, Cl. 431-1.000.

Marhic, Michel, to Northwestern University. Transmissive single-mode fiber optics star network. 4,708,424, Cl. 350-96.160.

Marino, Thomas F. Method for spill containment. 4,707,969, Cl. 53-449.000.

Mark, Alfred J.; and Debettin, Joseph H. P., to Chrysler Motors Corporation. Cutting and heat sealing apparatus for vehicle seat inserts. 4,708,760, Cl. 156-362.000.

Markarian, Temur G.: *See*—
Mkhikian, Robert M.; Shaginian, Suren G.; Markarian, Temur G.; Khaidukov, Georgy K.; Velidzhanian, Sofia V.; Manukian, Artashes R.; Karapetian, Artur K.; Kazarian, Aram V.; and Airapetian, Robert R., 4,708,628, Cl. 425-406.000.

Markow, Edward G.: *See*—
Kopsco, Michael A.; and Markow, Edward G., 4,708,186, Cl. 152-516.000.

Marlen Research Corporation: *See*—
Powers, Richard G.; Zeets, Joseph S.; Currier, Joseph G.; and Alley, Lewis F., 4,708,296, Cl. 241-82.200.

Marley-Wylain Company, The: *See*—
Nielsen, Darryl N.; and Wheeler, Charles F., 4,708,589, Cl. 415-199.200.
Wheeler, Charles F.; and Nielsen, Darryl M., 4,709,124, Cl. 174-65.00R.

Marsella, John A., to Air Products and Chemicals, Inc. Process for the synthesis of hydroxyalkyl amines and hydroxyalkyl piperazines. 4,709,034, Cl. 544-401.000.

Marshall, Robert. Space saver blender. 4,708,487, Cl. 366-206.000.

Marten, Finn L., to Air Products and Chemicals, Inc. Copolymers of vinyl acetate and poly(alkyleneoxy) acrylates. 4,708,999, Cl. 526-320.000.

Martin, Pierre, to Ciba-Geigy Corporation. Process for the preparation of 4-phenylpyrrole derivatives. 4,709,053, Cl. 548-561.000.

Martin, Raymond G.: *See*—
Gehman, Roland P.; and Martin, Raymond G., 4,708,358, Cl. 280-402.000.

Martin, Robert J.; and Sims, Claude, to Sparton Corporation. Hydrophone transducer with negative feedback system. 4,709,360, Cl. 367-157.000.

Martinez, Kenneth; and Mack, Gregory, to Paradyne. Viterbi decoder for wireline modems. 4,709,377, Cl. 375-75.000.

Maruhashi, Seiji: *See*—
Ohta, Harutaka; Miyamoto, Kazuchiyo; Terayama, Arataro; Maruhashi, Seiji; and Gohdo, Shigeru, 4,708,082, Cl. 114-230.000.

Maruhashi, Shigeaki: *See*—
Nakamura, Hajime; Iwase, Masanori; Ichise, Eiji; Moriya, Takaharu; and Maruhashi, Shigeaki, 4,708,783, Cl. 204-423.000.

Maruman Co., Ltd.: *See*—
Kobayashi, Masashi, 4,708,347, Cl. 273-171.000.

Maruyama, Hitoshi; Ono, Isao; Kohno, Hiroji; Yamauchi, Junnosuke; and Okaya, Takuji, to Kuraray Co., Ltd. Water resistant composition and heat-sensitive recording sheet containing the same. 4,708,947, Cl. 503-209.000.

Maruyama, Masahiro: *See*—
Hata, Kanji; Itemadani, Eiji; and Maruyama, Masahiro, 4,708,232, Cl. 198-346.100.

Maruyama, Masao: *See*—
Kimura, Kazuo; and Maruyama, Masao, 4,708,696, Cl. 474-103.000.

Maruzen Petrochemical Co., Ltd.: *See*—
Fujiwara, Hiroshi; Matsumoto, Tadashi; and Sekiya, Masaaki, 4,709,009, Cl. 528-481.000.

Marvanyos, Ede: *See*—
Heja, Gergely; Korbonits, Dezso ; Palosi, Endre; Kiss, Pal; Gonczi, Csaba; Szvoboda nee Kanzel, Ida; Marvanyos, Ede; Kun, Judit; Szomor nee Wundele, Maria; Szabo, Gabor; Kallay, Tamas; and Ledniczky, Laszlo , 4,709,081, Cl. 560-100.000.

Marvin, David H.: *See*—
Heimich, Melvin J.; Ryan, William P.; and Marvin, David H., 4,708,094, Cl. 123-27.0GE.

Marvin Glass & Associates: *See*—
Kulesza, Ralph J.; Wozniak, Walter J.; and Disko, Harry, 4,708,690, Cl. 446-351.000.
Meyer, Burton C.; and Fauser, Fritz, 4,707,921, Cl. 30-296.00R.
Zaruba, John V.; Hanson, Steven P.; and Kuna, Wayne A., 4,708,348, Cl. 273-246.000.

Maschinenfabrik Rieter AG: *See*—
Binder, Rolf; and Schlepfer, Walter, 4,707,888, Cl. 19-80.00R.

Masilamani, Divakaran; Hammond, George S.; and Murthy, Andiappan K. S., to Allied Corporation. Process for the production of methyl ethers from branched monoolefins. 4,709,101, Cl. 568-697.000.

Maslanka, William W., to Hercules Incorporated. Paper products containing wet strength resins. 4,708,772, Cl. 162-164.300.

Mast, Jan-Hilbert: *See*—
Bathelt, Heinrich; Ehrl, Winfried; Wehowsky, Frank; Kleber, Rolf; Lotz, Werner; Glenz, Wolfgang; Herdt, Hubert; Jackel, Lothar; Mast, Jan-Hilbert; Hintermeier, Karl; and Muller, Manfred, 4,709,074, Cl. 560-33.000.

Master Chemical Corporation: *See*—
Threadgill, James A., 4,708,539, Cl. 408-61.000.

Master Conveyor Corporation: *See*—
Mylrea, William J.; and Thompson, Gerald C., 4,708,564, Cl. 414-36.000.

Masterson, Ian F.; Feinstein, Jonathan J.; and Stambaugh, Lanier, to Union Carbide Corporation. Method for refining very small heats of molten metal. 4,708,738, Cl. 75-59.100.

Masuda, Hiroo: *See*—
Shimohigashi, Katsuhiro; Masuda, Hiroo; Ikuzaki, Kunihiko; and Kawamoto, Hiroshi, 4,709,353, Cl. 365-205.000.

Masuda, Shinichi, to Sharp Kabushiki Kaisha. Multifunctional telephone. 4,709,387, Cl. 379-354.000.

Masui, Takatoshi: *See*—
Katsuno, Toshiyasu; Nagai, Toshinari; Masui, Takatoshi; and Satou, Yasushi, 4,707,984, Cl. 60-274.000.
Nagai, Toshinari; Masui, Takatoshi; Sato, Yasushi; and Katsuno, Toshiyasu, 4,707,985, Cl. 60-274.000.

Masuyama, Shigeru: *See*—
Hasegawa, Toshiharu; Shen, Zai-ming; Muro, Shoujiro; Masuyama, Shigeru; and Toyooka, Akihisa, 4,709,364, Cl. 370-85.000.

Mathieu, Pierre: *See*—
Banon, Louis; Lajoie-Mazenc, Michel; and Mathieu, Pierre, 4,709,179, Cl. 310-156.000.

Matsuda, Toshiro, to Nissan Motor Company, Limited. Self-monitoring system for detecting error at output port during cold start of microprocessor system. 4,709,341, Cl. 364-550.000.

Matsui, Toshiro: *See*—
Takahashi, Kazuyoshi; Suzuki, Koji; Nagahira, Joji; Yoshihara, Kunio; Matsui, Toshiro; and Ishikawa, Tadashi, 4,709,319, Cl. 363-49.000.

Matsukuma, Ikuo: *See*—
Hirata, Tadashi; Matsukuma, Ikuo; Yoshiie, Shigeo; Sato, Kiyoshi; and Ohashi, Yoichi, 4,708,956, Cl. 514-210.000.

Matsumoto, Hiroo: *See*—
Takahashi, Yasuhiro; Arai, Kazutaka; Ohara, Yoshio; Matsumoto, Hiroo; and Tsuchiya, Syuuzi, 4,709,082, Cl. 560-105.000.

Matsumoto, Hiroshi: *See*—
Nagano, Eiki; Yoshida, Ryo; Matsumoto, Hiroshi; Hashimoto, Shunichi; and Kamoshita, Katsuzo, 4,709,049, Cl. 548-513.000.

Matsumoto, Ikuo: *See*—
Sekiya, Satoshi; Matsumoto, Ikuo; and Fujiki, Kuniharu, 4,708,906, Cl. 428-336.000.

Matsumoto, Kuniyoshi, to Sanshin Kogyo Kabushiki Kaisha. Separate lubricating system for marine propulsion device. 4,708,674, Cl. 440-88.000.

Matsumoto, Noboru: *See*—
Kurahashi, Yoshio; Shiokawa, Kozo; Goto, Toshio; Kagabu, Shinzo; Matsumoto, Noboru; and Moriya, Koichi, 4,708,953, Cl. 514-166.000.

Matsumoto, Tadao; and Inazuma, Sunao, to Nippon Suisan Kaisha, Ltd. Apparatus for continuously processing fish flesh. 4,708,055, Cl. 99-484.000.

Matsumoto, Tadashi: *See*—
Fujiwara, Hiroshi; Matsumoto, Tadashi; and Sekiya, Masaaki, 4,709,009, Cl. 528-481.000.

Matsumoto, Yasuo: *See*—
Hara, Seinosuke; Ofuji, Hiromichi; Miisyo, Kazuyuki; Matsumoto, Yasuo; and Kato, Manabu, 4,708,101, Cl. 123-90.160.

Matsumura, Yasuo: *See*—
Shimizu, Isoo; Matsumura, Yasuo; and Inomata, Yoshihisa, 4,709,089, Cl. 562-494.000.

Matsunaga, Kenichi: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,708,950, Cl. 514-42.000.

Matsunaga, Masakazu: *See*—
Kawabe, Ryoichi; Iwasaki, Tetsuo; Kozuru, Hiroshi; Yoda, Masashi; Matsunaga, Masakazu; Takamori, Takesi; and Nakasima, Matao, 4,707,867, Cl. 4-313.000.

Matsuno, Koichiro: *See*—
Kakii, Toshiaki; Matsuno, Koichiro; Suzuki, Shuzo; Ashiya, Fumihiro; and Ishihara, Koushi, 4,708,433, Cl. 350-96.220.

Matsuoka, Hiroshi: *See*—
Kondoh, Masahiko; and Matsuoka, Hiroshi, 4,708,463, Cl. 355-45.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Fujiwara, Makoto; Yoneda, Hajime; and Okamoto, Masafumi, 4,709,303, Cl. 361-433.000.
Hata, Kanji; Itemadani, Eiji; and Maruyama, Masahiro, 4,708,232, Cl. 198-346.100.
Kuriyama, Keiichi; Miura, Kenichiro; and Deguchi, Takashi, 4,709,292, Cl. 361-22.000.
Nishimichi, Yoshito; Uya, Masaru; and Kaneko, Katsuyuki, 4,709,173, Cl. 307-243.000.
Omoto, Noriaki, 4,709,406, Cl. 455-208.000.

Matsushita Electric Works, Ltd.: *See*—
Fujii, Toshinori; and Okamoto, Shinji, 4,708,545, Cl. 409-131.000.

Matsushita Electronics Corporation: *See*—
Itoh, Minoru, 4,709,380, Cl. 377-58.000.

Matsushita, Koichi: *See*—
Isohata, Junji; Yamamoto, Hironori; and Matsushita, Koichi, 4,708,465, Cl. 355-53.000.

Matthews, Randall S.: *See*—
Loomans, Maurice E.; Matthews, Randall S.; and Miller, Joseph A., 4,708,966, Cl. 514-689.000.

Matviya, Thomas M.; Gebhard, Robert S.; and Greenbank, Michael, to Calgon Carbon Corporation. Mercury adsorbent carbon molecular sieves and process for removing mercury vapor from gas streams. 4,708,853, Cl. 423-210.000.

Maucher, Paul, to Luk Lamellen und Kupplungsbau GmbH. Declutching device. 4,708,230, Cl. 192-98.000.

Maurer, Fritz: *See*—
Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hanssler, Gerd, 4,708,731, Cl. 71-90.000.

Maurer, Gerald L., to National Research Laboratories. Method and compositions for treating dental structures. 4,708,864, Cl. 424-49.000.

Maxson, Myron T., to Dow Corning Corporation. In situ low temperature siloxane gel. 4,709,001, Cl. 528-15.000.

Mazaki, Yoshiyuki, to Kabushiki Kaisha Murakoshi Seiko. Door device for furniture. 4,708,410, Cl. 312-138.00R.

Mazda Motor Corporation: *See*—
Hatamura, Kouichi; Hiraoka, Tetsuo; Hokazono, Kazuaki; and Seike, Shinji, 4,708,097, Cl. 123-52.00M.
Maebayashi, Jiro; and Hamamoto, Masaya, 4,708,389, Cl. 296-107.000.
Nakano, Mitusou, 4,708,391, Cl. 296-204.000.

McAuley, James A.; and Eppler, Susan G., to TTE Holding Corp. Method and apparatus for optimizing determination of the originating depth of borehole cuttings. 4,708,212, Cl. 175-42.000.

McCartney, Charles L. Method and apparatus for pulling a nose plug from a lock. 4,707,903, Cl. 29-426.500.

McClanahan, Robert F.; Washburn, Robert; and Hwang, William, to Hughes Aircraft Company. Traveling wave tube drive controller. 4,709,215, Cl. 330-43.000.

McCleerey, Earl W.: *See*—
Himes, John L., Jr.; McCleerey, Earl W.; and Reynolds, Charles E., 4,708,412, Cl. 439-95.000.

McConnell, Bernard E.; and McConnell, Thomas E. Ball joint coupling. 4,708,510, Cl. 403-90.000.

McConnell, Thomas E.: *See*—
McConnell, Bernard E.; and McConnell, Thomas E., 4,708,510, Cl. 403-90.000.

McCracken, Laurence W. Apparatus and method for increasing power output of an internal combustion engine. 4,708,098, Cl. 123-52.00M.

McDonnell Douglas Corporation: *See*—
Yasui, Ken K.; Williams, Neil R.; Ecklund, Richard C.; Hayase, Masashi; and Walkington, Robert J., 4,708,008, Cl. 72-60.000.

McDonnell, Michael L.: *See*—
Donovan, Dennis; McDonnell, Michael L.; Weigel, Gerald C.; and Long, John E., 4,708,877, Cl. 426-69.000.

McEachern, J. Albert, Jr.; and Brogdon, J. William, to Teledyne Industries, Inc. Lubrication system for a turbocharger. 4,708,602, Cl. 417-407.000.

McGlashen, James N., to Apsley Metals Limited, a British Company. Manufacture of pneumatic tires. 4,708,840, Cl. 264-501.000.

McGregor, Ian R.; Jackson, D. Keith; Brown, Walter F. M.; and Burrell, Kenneth, to Anachemia Solvents Limited. Disposal of wastes with solvent recovery. 4,708,775, Cl. 203-40.000.

McGregor, James D., to Morton Thiokol, Inc. Method of making a flexible bearing. 4,708,758, Cl. 156-245.000.

McKee Machinery Co., Inc.: *See*—
McKee, Theodore F., 4,708,071, Cl. 112-113.000.

McKee, Theodore F., to McKee Machinery Co., Inc. Ring positioning apparatus for sewing machine. 4,708,071, Cl. 112-113.000.

McKeon, Ronald J.: *See*—
Vasconcellos, Stephen R.; Najjar, Mitri S.; and McKeon, Ronald J., 4,708,819, Cl. 252-373.000.

McKnight Road Enterprises, Inc.: *See*—
Branom, David E., 4,709,307, Cl. 362-103.000.

McMahan, David R.; and Geddie, John D., to General Motors Corporation. Electrical connector for headlight assembly. 4,709,305, Cl. 362-61.000.

McMahon, Paul J.; and Sandusky, Heidi A., to Container Corporation of America. Combination display tray-connector device. 4,708,240, Cl. 206-45.180.

McManaman, Raymond M.: *See*—
Westover, Dwight G.; and McManaman, Raymond M., 4,707,917, Cl. 30-182.000.

McMillan, Larry: *See*—
Rohrer, George A.; and McMillan, Larry, 4,707,897, Cl. 29-25.420.

McMillin, John R., to Cornelius Company, The. Method of and apparatus for making and dispensing carbonated water with a double diaphragm pneumatic water pump. 4,708,827, Cl. 261-35.000.

McMurtrie, Andrew: *See*—
Lamb, Charles G.; and McMurtrie, Andrew, 4,708,150, Cl. 131-336.000.

McNeal, Joseph R., to Scott USA Limited Partnership. Anti-fog goggle with foam frame. 4,707,863, Cl. 2-436.000.

McNeilab, Inc.: *See*—
Troutner, Vernon H.; and King, Martin J., 4,708,715, Cl. 604-6.000.

McPherson, James N., to Smith International, Inc. Diamond bearing and manufacture thereof. 4,708,496, Cl. 384-303.000.

Meadowbrook Industries, Inc.: *See*—
Poor, David D. S., 4,708,503, Cl. 400-531.000.

Meddings, Basil, to Sherritt Gordon Mines Limited. Quadrupole mass spectrometers. 4,709,148, Cl. 250-292.000.

Mednis, Juris M., to Universal Symetrics Corporation. Multiple interconnected containers with elongated necks and transverse recesses. 4,708,253, Cl. 215-10.000.

Medtronic, Inc.: *See*—
Tacker, Willis A., Jr.; Bourland, Joe D.; Babbs, Charles F.; and Geddes, Leslie A., 4,708,145, Cl. 128-419.00D.

Meheen Engineering Corp.: *See*—
Meheen, H. Joe, 4,707,962, Cl. 52-565.000.

Meheen, H. Joe, to Meheen Engineering Corp. Cascade wall structure. 4,707,962, Cl. 52-565.000.

Mehrgardt, Soenke, to Deutsche ITT Industries GmbH. Circuit arrangement for filtering and demodulating a signal frequency-modulator with at least one audio signal. 4,709,270, Cl. 358-188.000.

Mehta, Avinash C., to Polaroid Corporation. 2-(formylphenyl) benzotriazole intermediates. 4,709,041, Cl. 548-260.000.

Meijer, Roelf J., to Stirling Thermal Motors, Inc. Solar powered Stirling engine. 4,707,990, Cl. 60-641.150.

Meininger, Siegfried, to Kraftwerk Union Aktiengesellschaft. Waste removal system for problematic materials. 4,708,641, Cl. 432-72.000.

Melan, Corneille; and Liesch, Jean, to Paul Wurth S.A.; and Arbed S.A. Apparatus for lining the inner wall of a vessel with bricks. 4,708,562, Cl. 414-10.000.

Melgara, Marcello: *See*—
Capizzi, Giuseppe N.; Cianci, Cesario; and Melgara, Marcello, 4,709,340, Cl. 364-513.500.

Meltz, Clifford N.: *See*—
Chang, Ping W.; Gruetzmacher, Gordon D.; Meltz, Clifford N.; and Totino, Rocco A., 4,708,974, Cl. 523-130.000.

Mendres, Donald N. Floating resilient skeletal chameleon-like audible helix for bicycle. 4,708,399, Cl. 301-37.0SA.

Meng, Sen Y., to Rockwell International Corporation. Shrouded inducer pump. 4,708,584, Cl. 415-53.00R.

Merant, Jean-Camille: *see*—
Deux, Alain; Merant, Jean-Camille; Gibert, Francois; and Berger, Antoine, 4,707,973, Cl. 56-328.00R.

Merck & Co., Inc.: *See*—
Hartman, George D., 4,709,035, Cl. 544-407.000.

Merck Patent Gesellschaft mit beschrankter Haftung: *See*—
Holzemann, Gunter; Raddatz, Peter; Jonczyk, Alfred; and Schmitges, Claus J., 4,709,010, Cl. 530-323.000.

Mercurio, Dominic G.: *See*—
Goldberg, Benjamin L.; and Mercurio, Dominic G., 4,708,687, Cl. 446-269.000.

Merger, Franz; Hutmacher, Hans-Martin; Hettinger, Peter; Voges, Dieter; and Lengsfeld, Wolfgang, to BASF Aktiengesellschaft. Joint preparation of ethylene cyanohydrin and its ethers. 4,709,072, Cl. 558-450.000.

Merger, Franz: *See*—
Hoelderich, Wolfgang; Merger, Franz; and Fischer, Rolf, 4,709,097, Cl. 568-443.000.

Merkli, Peter; and Jermann, Daniel, to Grapha-Holding AG. Apparatus for accumulating and transporting stacks of paper sheets and the like. 4,708,561, Cl. 412-25.000.

Merle, Michel: *See*—
Labedan, Jean-Denis; and Merle, Michel, 4,708,498, Cl. 384-560.000.

Mesenich, Gerhard; Bart, Hansueli; and Alsbrook, Daniel E., to Colt Industries Inc. Multi-point fuel injection apparatus. 4,708,117, Cl. 123-533.000.

Messerschmitt-Bolkow-Blohm GmbH: *See*—
Hofmann, Otto, 4,708,472, Cl. 356-2.000.

Messrs. Karl Storz GmbH & Co.: *See*—
Miketic, Sinisa; Schade, Udo; and Schade, Michael, 4,708,125, Cl. 128-4.000.

Metacon AG: *See*—
Tinnes, Bernhard, 4,708,193, Cl. 164-453.000.

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Sieverding, Werner; Mettenbrink, Herbert; Pohlmann, Gunter; and Hackmann, Ludger, 4,708,267, Cl. 222-211.000.

Mettler, Paul: *See*—
Tengler, Hermann; and Mettler, Paul, 4,709,132, Cl. 219-110.000.

Metzdorff, Walter; Lux, Peter; and Eibert, Max, to Dornier GmbH. Acquisition of range images. 4,708,473, Cl. 356-5.000.

Mewshaw, Richard E.; and Commons, Thomas J., to American Home Products Corporation. Beta-lactams substituted at C-4 with substituted aminooxymethyl. 4,709,025, Cl. 540-355.000.
Meyer, Burton C.; and Fauser, Fritz, to Marvin Glass & Associates. Extension handle for a handheld electrically powered tool. 4,707,921, Cl. 30-296.00R.
Meyer, Gerhard: *See*—
Diamantoglou, Michael; Magerlein, Helmut; Brodowski, Walter; Grimm, Wolfgang; and Meyer, Gerhard, 4,708,985, Cl. 525-166.000.
Meyer, Horst: *See*—
Ingendoh, Axel; Meyer, Horst; and Garthoff, Bernward, 4,709,031, Cl. 544-333.000.
Meyer, Walter W.: *See*—
Pedrazzetti, Enes; Schmitter, Andre ; and Meyer, Walter W., 4,708,979, Cl. 524-249.000.
MGS, Inc.: *See*—
Gehman, Roland P.; and Martin, Raymond G., 4,708,358, Cl. 280-402.000.
Micafil, Inc.: *See*—
Boers, Arie, 4,708,297, Cl. 242-7.05B.
Micheron, Francois: *See*—
Brousoux, Dominique; and Micheron, Francois, 4,708,989, Cl. 525-199.000.
Microgenics Corporation: *See*—
Henderson, Daniel R., 4,708,929, Cl. 435-7.000.
Micronix Corporation: *See*—
Shimkunas, Alexander R.; and LaBrie, James J., 4,708,919, Cl. 430-5.000.
Midooka, Masanori; Kubo, Takashi; Fujikawa, Atsunobu; and Motoda, Masanori, to Toyoda Gosei Co., Ltd; and Toyota Jidosha Kabushiki Kaisha. Sealed joint including water-absorptive, water-swelling coating at joint interface site for using leakage to repair leaks. 4,708,351, Cl. 277-184.000.
Mielnik, Thaddeus J., Jr.; Fisher, Kenneth J.; and Aggarwal, Mahesh C., to American Sterilizer Company. Process for energy storage and recovery. 4,708,849, Cl. 422-26.000.
Miboya, Takashi: *See*—
Ohtsuki, Akira; Konno, Ryozo; Kanno, Nobumori; Sugai, Makio; Miboya, Takashi; Kubota, Yuichi; Nishimatsu, Masaharu; Isobe, Yukihiro; Tanaka, Kazushi; and Shinoura, Osamu, 4,708,909, Cl. 428-425.900.
Miisyo, Kazuyuki: *See*—
Hara, Seinosuke; Ofuji, Hiromichi; Miisyo, Kazuyuki; Matsumoto, Yasuo; and Kato, Manabu, 4,708,101, Cl. 123-90.160.
Mikelait, Robert C.: *See*—
Horn, Gary R.; and Mikelait, Robert C., 4,709,348, Cl. 364-900.000.
Miketic, Sinisa; Schade, Udo; and Schade, Michael, to Messrs. Karl Storz GmbH & Co. Apparatus for controlling a probe of an endoscopy device. 4,708,125, Cl. 128-4.000.
Mildrum, Claude M.; and Taleyarkhan, Rusi P., to Westinghouse Electric Corp. BWR fuel assembly with improved spacer and fuel bundle design for enhanced thermal-hydraulic performance. 4,708,845, Cl. 376-435.000.
Miller, E. James. Asphalt pavement. 4,708,516, Cl. 404-31.000.
Miller, Joseph A.: *See*—
Loomans, Maurice E.; Matthews, Randall S.; and Miller, Joseph A., 4,708,966, Cl. 514-689.000.
Miller, Larry G.; Whiting, Harold E.; and Willcox, Dale, to Furnas Electric Company. Pressure switch with rolling diaphragm. 4,709,126, Cl. 200-83.00P.
Miller, Phillip E.: *See*—
Spiegelman, Stanley R.; Miller, Phillip E.; and Shaffer, Robert, 4,708,324, Cl. 266-87.000.
Miller, Thomas J.; and Nicol, David A., to AT&T Technologies, Inc. Fabrication of a lightguide preform by the outside vapor deposition process. 4,708,726, Cl. 65-3.120.
Mills, Ronald E.: *See*—
Moore, Michael O.; and Mills, Ronald E., 4,708,386, Cl. 296-37.800.
Millstein, Philip L. Occlusal clearance indicator. 4,708,649, Cl. 433-71.000.
MIM Industries, Inc.: *See*—
Frye, Ricky J., 4,708,072, Cl. 112-121.270.
Minami, Keijiro: *See*—
Ogawa, Motokazu; Nishiguchi, Yasuo; and Minami, Keijiro, 4,708,915, Cl. 428-698.000.
Mineral Preparation, Inc.: *See*—
Cox, Bernie F., 4,708,789, Cl. 209-457.000.
Minigrip, Inc.: *See*—
Aunit, Steven, 4,709,398, Cl. 383-63.000.
Minion, Aaron A., to Minnesota Mining and Manufacturing Company. Shipping package for recording tape pancakes. 4,708,246, Cl. 206-394.000.
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Stevenson, Barry E., 4,707,931, Cl. 34-10.000.
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Emslander, Jeffrey O.; and Larson, Curtis L., 4,708,249, Cl. 206-630.000.
Geisler, Thomas C., 4,708,928, Cl. 430-619.000.
Minion, Aaron A., 4,708,246, Cl. 206-394.000.
Newman, Stephen, 4,708,925, Cl. 430-270.000.
Orensteen, Bruce D.; and Bradshaw, Thomas I., 4,708,920, Cl. 430-11.000.
Mino, Iwao: *See*—
Sakai, Etsuo; Nishioka, Asaaki; Watanabe, Kiyosi; and Mino, Iwao, 4,708,626, Cl. 425-398.000.
Minolta Camera Kabushiki Kaisha: *See*—
Otsuki, Hajime; Ishii, Kenjiro; Satoh, Yutaka; and Fukumoto, Fumio, 4,708,464, Cl. 355-45.000.
Ueda, Masahide; and Ohira, Tadashi, 4,708,458, Cl. 355-3.0DD.
Miranda, Thomas J., to Whirlpool Corporation. Semi-organic foams. 4,708,970, Cl. 521-123.000.
Mirow, Fred. High efficiency transformerless AC/DC converter. 4,709,322, Cl. 363-86.000.
Mirsberger, Helmut: *See*—
Richter, Hanno; Mirsberger, Helmut; Uhlig, Raimer; Haage, Manfred; and Uebel, Philipp, 4,708,551, Cl. 411-32.000.
Mishima, Mannen: *See*—
Yamatsu, Isao; Abe, Shinya; Inai, Yuichi; Suzuki, Takeshi; Kinoshita, Kensaku; Mishima, Mannen; Katoh, Yoshinori; Kobayashi, Seiichi; Murakami, Manabu; and Yamada, Kouzi, 4,709,079, Cl. 560-66.000.
Misumi, Teruyuki: *See*—
Hayashi, Yoshiharu; and Misumi, Teruyuki, 4,708,734, Cl. 71-100.000.
Mita Industrial Co., Ltd.: *See*—
Satonaka, Shinobu; Takahashi, Masanobu; Wakikaido, Takahiro; and Yoshioka, Masahiro, 4,708,470, Cl. 355-77.000.
Shibata, Kiyoshi; and Shigemura, Yutaka, 4,708,456, Cl. 355-3.0SH.
Mitchell, Glen R.: *See*—
Anthony, Bruce O., Jr.; Batalden, Glenn D.; Mitchell, Glen R.; Schloss, Phillip C.; and Wells, David K., 4,709,328, Cl. 364-200.000.
Mitchell, Thomas A.; Bennett, John E.; Brown, Claude M.; and Polito, Gerald R., to ELTECH Systems Corporation. Coating metal mesh. 4,708,888, Cl. 427-126.100.
Mitomi, Seiji, to Nifco, Inc. Device for fastening band-like member passed therethrough. 4,708,306, Cl. 248-74.300.
Mitomo, Takeshi: *See*—
Yogo, Takeji; Nakagaki, Akitsuna; Miyazawa, Akio; Mitomo, Takeshi; and Ichihara, Takayuki, 4,708,199, Cl. 165-167.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Ichinose, Katsuki; and Shinohara, Hirofumi, 4,709,354, Cl. 365-226.000.
Koike, Kazuo, 4,709,286, Cl. 360-105.000.
Makino, Katsumi, 4,709,308, Cl. 362-148.000.
Mizohata, Fumio; and Goto, Shigetada, 4,709,161, Cl. 307-270.000.
Sakase, Toshihiko; and Ogasa, Michio, 4,709,220, Cl. 335-214.000.
Shimizu, Masahiro; Okamoto, Tatsuo; and Tsukamoto, Katsuhiro, 4,708,904, Cl. 428-209.000.
Yagi, Shigeichi; and Shigeura, Junichi, 4,709,194, Cl. 318-52.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Fujiwara, Haruyoshi; Makino, Tetsuo; and Iwata, Hiroshi, 4,708,773, Cl. 162-300.000.
Goto, Touru; and Konishi, Takashi, 4,709,383, Cl. 378-72.000.
Katayama, Kazuso; Ichiryu, Taku; Mouri, Yasushi; Mitsuhashi, Tsuneyoshi; and Kobayashi, Masanori, 4,708,587, Cl. 415-104.000.
Mitsubishi Rayon Co., Ltd.: *See*—
Yata, Yukio; and Suzuki, Shingo, 4,708,435, Cl. 350-129.000.
Mitsuboshi Belting Ltd.: *See*—
Takano, Hiroshi; Takagi, Shinichi; Wada, Kiyokazu; Konishi, Sadaichi; and Kanaoka, Tomizo, 4,708,699, Cl. 474-144.000.
Mitsuhashi, Tsuneyoshi: *See*—
Katayama, Kazuso; Ichiryu, Taku; Mouri, Yasushi; Mitsuhashi, Tsuneyoshi; and Kobayashi, Masanori, 4,708,587, Cl. 415-104.000.
Mitteregger, Erich; and Schwaiger, Ernst, to I.F.W.-Industrie-Formen und Werkzeugbau-Manfred Otte Gesellschaft m.b.H. & Co. KG. Injection moulding mould. 4,708,632, Cl. 425-556.000.
Miura, Kenichiro: *See*—
Kuriyama, Keiichi; Miura, Kenichiro; and Deguchi, Takashi, 4,709,292, Cl. 361-22.000.
Miura, Yoshio: *See*—
Inoue, Noboru; and Miura, Yoshio, 4,708,141, Cl. 128-334.00R.
Miutel, Alexander; and Shira, Jerry P., to Phoenix Foam Inc. Fire retardant plastics material. 4,708,977, Cl. 523-402.000.
Miwa, Junichi: *See*—
Ito, Hajime; and Miwa, Junichi, 4,708,891, Cl. 427-245.000.
Miyake, Takashi, to Toyota Jidosha Kabushiki Kaisha. Internal combustion engine having a mechanical supercharger. 4,708,119, Cl. 123-559.000.
Miyamoto, Kazuchiyo: *See*—
Ohta, Harutaka; Miyamoto, Kazuchiyo; Terayama, Arataro; Maruhashi, Seiji; and Gohdo, Shigeru, 4,708,082, Cl. 114-230.000.
Miyamoto, Takeaki: *See*—
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Miyazaki, Makoto: *See*—
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Miyazawa, Akio: *See*—
Yogo, Takeji; Nakagaki, Akitsuna; Miyazawa, Akio; Mitomo, Takeshi; and Ichihara, Takayuki, 4,708,199, Cl. 165-167.000.
Mizoguchi, Saburo, to Sharp Kabushiki Kaisha. Supersonic humidifier. 4,708,826, Cl. 261-30.000.
Mizohata, Fumio; and Goto, Shigetada, to Mitsubishi Denki Kabushiki Kaisha. Transistor drive circuit. 4,709,161, Cl. 307-270.000.
Mizuhara, Howard: *See*—
Hsieh, Martin Y.; and Mizuhara, Howard, 4,708,943, Cl. 501-98.000.

Mizumoto, Muneo; Inouye, Hiroshi; and Kitsunai, Hiroyuki, to Hitachi, Ltd. Magnetic liquid seal with magnetized deformable magnet. 4,708,350, Cl. 277-80.000.
Mizusawa, Akira, to Nifco, Inc. Plastic fastener. 4,708,895, Cl. 428-31.000.
Mizuta, Ken, to Alps Electric Co., Ltd. Power window device with safety detector and control override. 4,709,196, Cl. 318-282.000.
Mkhikian, Robert M.; Shaginian, Suren G.; Markarian, Temur G.; Khaidukov, Georgy K.; Velidzhanian, Sofia V.; Manukian, Artashes R.; Karapetian, Artur K.; Kazarian, Aram V.; and Airapetian, Robert R., to Nauchno-Issledovatelsky Institut Stroitelstva I Arkhitektury. Apparatus for molding articles from fibrous concrete. 4,708,628, Cl. 425-406.000.
MM Systems Corporation: *See*—
Nicholas, John D.; Petree, Larry M.; and Attaway, Julian J., 4,708,517, Cl. 404-64.000.
Mobil Oil Corporation: *See*—
Harandi, Mohsen N.; Owen, Hartley; and Smyth, Sean C., 4,709,113, Cl. 585-640.000.
Herrington, Fox J., 4,708,617, Cl. 425-135.000.
Jennings, Alfred R., Jr., 4,708,206, Cl. 166-281.000.
Rodewald, Paul G., 4,709,110, Cl. 585-463.000.
Rodewald, Paul G.; and Valyocsik, Ernest W., 4,709,114, Cl. 585-640.000.
Yan, Tsoung Y., 4,709,118, Cl. 585-820.000.
Mobilio, Dominick; Demerson, Christopher A.; and Humber, Leslie G., to American Home Products Corp. Production of substituted 2,3,4,9-tetrahydro-1H-carbazole-1-acetic acid derivatives. 4,709,048, Cl. 548-439.000.
Mochida, Masaaki: *See*—
Fujiu, Takamitsu; Mochida, Masaaki; and Ogino, Makoto, 4,708,652, Cl. 433-201.100.
Mock, Elmar; and Hotz, Jean-Marie, to ETA SA Fabriques d'Ebauches. Watch case element and wristlet assembly. 4,708,492, Cl. 368-282.000.
Moen, Lenard E. Process of recubing boxes. 4,708,583, Cl. 414-786.000.
Mohn, Walter R., to Allied Corporation. Method and apparatus for rapidly solidifying metal employing a metallic conditioning brush. 4,708,194, Cl. 164-463.000.
Molaug, Ole; Havrevold, Sveinung B.; and Skjæveland, Odd, to Akva A/S. Method for feeding fish. 4,708,090, Cl. 119-51.00R.
Moline, Edward F., to Artos Engineering Company. Terminal applicator having quick-adjust connecting link. 4,707,913, Cl. 29-753.000.
Molkner, Thomas: *See*—
Burger, Kurt; Friedrich, Heinz; Molkner, Thomas; and Schottle, Peter, 4,708,769, Cl. 156-659.100.
Molnar, Bela, to Protective Plastics Limited. Laminated panel with integral raised scuff. 4,708,899, Cl. 428-60.000.
Momose, Atsushi: *See*—
Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Shiozumi, Motoji; Takahashi, Kunio; Torao, Akira; Moriya, Susumu; and Momose, Atsushi, 4,708,882, Cl. 427-1.000.
Momose, Yutaka; and Yamaguro, Akira, to Aisin Seiki Kabushiki Kaisha. Combustor for external combustion engine having rotary-type regenerator heat exchanger. 4,708,639, Cl. 431-215.000.
Monroe, Lusbert L.: *See*—
Bills, Randall C.; Bumgardner, Teddy E.; Monroe, Lusbert L.; and Zimmermann, Jeffery D., 4,708,222, Cl. 187-1.00R.
Monroe, Roy K.: *See*—
Everhard, Paul R.; and Monroe, Roy K., 4,707,908, Cl. 29-526.00R.
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., to Institut Pasteur; and United States of America, Health and Human Services. Human immunodeficiency viruses associated with acquired immune deficiency syndrome (AIDS), namely human immunodeficiency virus (HIV), a diagnostic method for aids and pre-aids, and a kit therefor. 4,708,818, Cl. 435-5.000.
Montblanc-Simplo GmbH: *See*—
Herrnring, Gunther, 4,708,506, Cl. 401-151.000.
Montefusco, Oscar V.: *See*—
Kober, Frederick P.; and Montefusco, Oscar V., 4,707,911, Cl. 29-623.500.
Montgomery, Calvin W. Knife with retractable point protector. 4,707,920, Cl. 30-294.000.
Moore Business Forms, Inc.: *See*—
Greig, Walter G., 4,708,369, Cl. 283-108.000.
Moore, George B. Vehicle steering stabilizer. 4,708,354, Cl. 280-94.000.
Moore, Michael G.; and Mills, Ronald E., to Chrysler Motors Corporation. Integrated console cup holder. 4,708,386, Cl. 296-37.800.
Moore, Robert L. Structural beam and blank for forming it. 4,708,691, Cl. 446-488.000.
Morgan, Lee R. Method of treating herpes virus infections with N,N'-diacetylcystine and derivatives. 4,708,965, Cl. 514-563.000.
Mori, Kei. Light radiator. 4,709,304, Cl. 362-32.000.
Mori, Kei. Optical communication system. 4,709,411, Cl. 455-601.000.
Mori, Sadao; and Akatsu, Toshio, to Hitachi, Ltd. Method of and apparatus for optically measuring displacement. 4,708,481, Cl. 356-358.000.
Morimoto, Yoshihiko; and Tezuka, Kazunari, to Fuji Jukogyo Kabushiki Kaisha. Transmission ratio control system for a continuously variable transmission. 4,708,031, Cl. 74-866.000.
Morita, Shigeru; and Sugaya, Yukio, to Kabushiki Kaisha S.K.K. Fuse device. 4,709,222, Cl. 337-273.000.
Moritani, Nakanobu; Sugita, Mitsuyuki; Hoshino, Isamu; Yanagi, Hirofumi; Ikeno, Hitoshi; and Konno, Tetsuro, to Seikosha Co., Ltd. Overtone crystal oscillator. 4,709,218, Cl. 331-116.0FE.
Moriya, Koichi: *See*—
Kurahashi, Yoshio; Shiokawa, Kozo; Goto, Toshio; Kagabu, Shinzo; Matsumoto, Noboru; and Moriya, Koichi, 4,708,953, Cl. 514-166.000.
Moriya, Susumu: *See*—
Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Shiozumi, Motoji; Takahashi, Kunio; Torao, Akira; Moriya, Susumu; and Momose, Atsushi, 4,708,882, Cl. 427-1.000.
Moriya, Takaharu: *See*—
Nakamura, Hajime; Iwase, Masanori; Ichise, Eiji; Moriya, Takaharu; and Maruhashi, Shigeaki, 4,708,783, Cl. 204-423.000.
Moriyama, Moboru: *See*—
Fukumoto, Yasuhisha; and Moriyama, Moboru, 4,709,091, Cl. 562-595.000.
Morland, Mark R.; Cole, Paul A.; Cousins, Ivan J.; and Zandonatti, Raymond A., to Tektronix, Inc. Modified BNC connector for active probe. 4,708,661, Cl. 439-77.000.
Morrison, Garrett L., to Passanaquoddy Tribe. Method and system for exhaust gas stream scrubbing. 4,708,855, Cl. 423-235.000.
Morrison, John; Siskind, Eric J.; and Frost, Meryll M., Jr., to North Shore University Hospital. High speed image data processing. 4,709,332, Cl. 364-414.000.
Morriss, James C., Jr. Tapping sleeve or service clamp for use in attaching a branch pipe to a main in a fluid supply system. 4,708,373, Cl. 285-156.000.
Morton Thiokol, Inc.: *See*—
McGregor, James D., 4,708,758, Cl. 156-245.000.
Singer, Victor, 4,707,899, Cl. 29-157.00C.
Moss, John S.: *See*—
Langenberg, Anthony J.; Chu, Pak-Jong; Moss, John S.; and Collar, Geoffrey A., 4,709,389, Cl. 379-424.000.
Moszkowski, Stefan J. Device for acting on and treating surfaces, for instance for picking up particles, leaves and litter. 4,707,879, Cl. 15-345.000.
Moteki, Tsutomu: *See*—
Aoki, Kazuo; and Moteki, Tsutomu, 4,708,623, Cl. 425-202.000.
Moteurs Leroy-Somer: *See*—
Roux, Yves M. J. P.; and Pitaud, Patrice G. L., 4,709,203, Cl. 322-87.000.
Motoda, Masanori: *See*—
Midooka, Masanori; Kubo, Takashi; Fujikawa, Atsunobu; and Motoda, Masanori, 4,708,351, Cl. 277-184.000.
Motomak Motorenbau, Maschinen- und Werkzeugfabrik, Konstruktionen GmbH: *See*—
Speil, Walter, 4,708,103, Cl. 123-90.460.
Motoren-Werke Mannheim Aktiengesellschaft: *See*—
Gaa, Roland; and Kinzel, Richard, 4,708,116, Cl. 123-506.000.
Motorola, Inc.: *See*—
Crawford, Robert J., 4,709,344, Cl. 364-724.000.
Dahl, Randy L., 4,709,142, Cl. 250-221.000.
Davis, William F., 4,709,216, Cl. 330-252.000.
Edminster, Robert E., 4,708,511, Cl. 403-316.000.
Folk, Lee E.; and Derrington, Carl E., 4,708,012, Cl. 73-4.00R.
Hammond, Ray L.; and Chatham, Thomas B., 4,708,889, Cl. 427-140.000.
Kloker, Kevin L., 4,709,324, Cl. 364-200.000.
Main, William E., 4,709,171, Cl. 307-567.000.
Pace, Wilson D., 4,709,159, Cl. 307-227.000.
Salzer, William E., 4,709,258, Cl. 358-27.000.
Mouri, Yasushi: *See*—
Katayama, Kazuso; Ichiryuu, Taku; Mouri, Yasushi; Mitsuhashi, Tsuneyoshi; and Kobayashi, Masanori, 4,708,587, Cl. 415-104.000.
Mraz, Jaroslav: *See*—
Nagl, Michael; Fugger, Gerhard; Mraz, Jaroslav; Mailander, Horst; Rottenmanner, Ernst; Rauber, Norbert; and Luger, Wolfgang, 4,708,643, Cl. 432-95.000.
Mroz, Joseph. Internal combustion engine. 4,708,096, Cl. 123-48.00A.
MTA Kozponti Kemiai I Kutato Intezet: *See*—
Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Nagy, Mihaly; and Bacskai, Gyorgy, 4,708,733, Cl. 71-94.000.
Muller, Friedrich: *See*—
Tietze, Jurgen; Danguillier, Wilhelm; Thubeaville, Heinz; Pohl, Siegfried; and Muller, Friedrich, 4,708,196, Cl. 165-47.000.
Muller, Kurt; Gruber, Peter; and Wuthrich, Alfred, to Cerberus AG. Infrared intrusion detector. 4,709,152, Cl. 250-342.000.
Muller, Manfred: *See*—
Bathelt, Heinrich; Ehrl, Winfried; Wehowsky, Frank; Kleber, Rolf; Lotz, Werner; Glenz, Wolfgang; Herdt, Hubert; Jackel, Lothar; Mast, Jan-Hilbert; Hintermeier, Karl; and Muller, Manfred, 4,709,074, Cl. 560-33.000.
Muller, Walter: *See*—
Rolf, Meinhard; Neeff, Rutger; and Muller, Walter, 4,709,019, Cl. 534-655.000.
Mulzet, Alfred P., to Cobe Laboratories, Inc. Continuous-loop centrifugal separator. 4,708,712, Cl. 494-45.000.
Murai, Shunji: *See*—
Kishi, Hiroshi; Oshio, Minoru; Murai, Shunji; Wada, Takeshi; and Fukui, Masami, 4,709,299, Cl. 361-321.000.
Murakami, Azuma; Katsurahira, Yuji; and Taguchi, Yoshinori, to Wacom Co., Ltd. Magnetostrictive vibration wave position detecting apparatus with variable threshold detecting valves. 4,709,209, Cl. 324-207.000.
Murakami, Kenjiro, to Seiko Espon Kabushiki Kaisha. Mounting mechanism for a print head. 4,708,502, Cl. 400-175.000.

Murakami, Manabu: *See*—
Yamatsu, Isao; Abe, Shinya; Inai, Yuichi; Suzuki, Takeshi; Kinoshita, Kensaku; Mishima, Mannen; Katoh, Yoshinori; Kobayashi, Seiichi; Murakami, Manabu; and Yamada, Kouzi, 4,709,079, Cl. 560-66.000.

Murakami, Shiro: *See*—
Endo, Juro; Murakami, Shiro; Takada, Yukiharu; and Koike, Yoshiharu, 4,709,284, Cl. 360-103.000.

Murata, Kenji: *See*—
Ogawa, Takashi; Shirogami, Tamotsu; and Murata, Kenji, 4,708,916, Cl. 429-38.000.

Murata Manufacturing Co., Ltd.: *See*—
Saito, Shigeki; Hosokawa, Takao; and Mae, Masataka, 4,708,885, Cl. 427-58.000.

Murayama, Koji: *See*—
Sugita, Terumitsu; Shinozuka, Hideo; and Murayama, Koji, 4,708,598, Cl. 417-295.000.

Muro, Shoujiro: *See*—
Hasegawa, Toshiharu; Shen, Zai-ming; Muro, Shoujiro; Masuyama, Shigeru; and Toyooka, Akihisa, 4,709,364, Cl. 370-85.000.

Murphy, Donald M.: *See*—
Bazan, Alberto; and Murphy, Donald M., 4,708,601, Cl. 417-393.000.

Murphy, Stephan D.; and Derkacs, Thomas, to Ex-Cell-O Corporation. Method and apparatus for inspecting a surface. 4,709,156, Cl. 250-560.000.

Murrell, Lawrence L.; and Dispenziere, Nicholas C., Jr., to Exxon Research and Engineering Company. Catalysts comprising silica supported on a boehmite-like surface, their preparation and use. 4,708,945, Cl. 502-263.000.

Murrin, Thomas A.: *See*—
Field, Thomas T.; Murrin, Thomas A.; and Ault, Earle A., 4,708,750, Cl. 148-11.50N.

Murthy, Andiappan K. S.: *See*—
Masilamani, Divakaran; Hammond, George S.; and Murthy, Andiappan K. S., 4,709,101, Cl. 568-697.000.

Musil, Edward C., to Flexible Steel Lacing Company. Wire fastener. 4,708,558, Cl. 411-457.000.

Musselmann, Walter, to J. M. Voith GmbH. System for waste paper conditioning. 4,708,295, Cl. 241-46.170.

Mustikka, Lauri A.: *See*—
Honkaniemi, Matti E.; Mustikka, Lauri A.; Jankkila, Martti J.; Hokkanen, Pentti O.; Heikkila, Risto M.; and Lilja, Launo L., 4,708,640, Cl. 432-14.000.

Mutschall, Hugo: *See*—
Focke, Heinz; and Mutschall, Hugo, 4,708,704, Cl. 493-151.000.

Myers, Drewfus Y., Jr.; Alexandrovich, Peter S.; Pearce, Glenn T.; Santilli, Domenic; Sreekumar, Chandrasekha; Berwick, Martin A.; Upson, Donald A.; and Goebel, William K., to Eastman Kodak Company. Crosslinked vinyl polymer particles and electrographic elements and liquid developers containing such particles. 4,708,923, Cl. 430-112.000.

Myers, George D., deceased (by Myers, Virginia K., administratrix), to Ashland Oil, Inc. Carbo-metallic oil conversion. 4,708,785, Cl. 208-113.000.

Myers, Virginia K., administratrix: *See*—
Myers, George D., deceased, 4,708,785, Cl. 208-113.000.

Myirea, William J.; and Thompson, Gerald C., to Master Conveyor Corporation. Palletizing apparatus. 4,708,564, Cl. 414-36.000.

N.S.M. Corporation: *See*—
Cusson, Paul R., 4,709,241, Cl. 343-916.000.

Nabisco Brands, Inc.: *See*—
Hussein, Mamoun M., 4,708,880, Cl. 426-424.000.

NACO Industries, Inc.: *See*—
Cox, Delbert L., 4,708,374, Cl. 285-156.000.

Nadella: *See*—
Labedan, Jean-Denis; and Merle, Michel, 4,708,498, Cl. 384-560.000.

Nagahama, Masamitsu; and Suzuki, Kazunori, to Pentel Kabushiki Kaisha. Ink guide for writing instruments. 4,708,508, Cl. 401-199.000.

Nagahira, Joji: *See*—
Takahashi, Kazuyoshi; Suzuki, Koji; Nagahira, Joji; Yoshihara, Kunio; Matsui, Toshiro; and Ishikawa, Tadashi, 4,709,319, Cl. 363-49.000.

Nagai, Akira: *See*—
Ejiri, Yoshihiro; Nagai, Akira; Nakai, Taiichiro; and Niiro, Yasuhiko, 4,708,427, Cl. 350-96.200.

Nagai, Tatsuo; Suzuki, Shinichi; and Yamazaki, Hiroshi, to Konishiroku Photo Industry Co., Ltd. Pressure fixable microcapsule type toner. 4,708,924, Cl. 430-138.000.

Nagai, Toshinari; Masui, Takatoshi; Sato, Yasushi; and Katsuno, Toshiyasu, to Toyota Jidosha Kabushiki Kaisha. Double air-fuel ratio sensor system carrying out learning control operation. 4,707,985, Cl. 60-274.000.

Nagai, Toshinari: *See*—
Katsuno, Toshiyasu; Nagai, Toshinari; Masui, Takatoshi; and Satou, Yasushi, 4,707,984, Cl. 60-274.000.

Nagano, Eiki; Yoshida, Ryo; Matsumoto, Hiroshi; Hashimoto, Shunichi; and Kamoshita, Katsuzo, to Sumitomo Chemical Company, Limited. 2-substituted phenyl-4,5,6,7,-tetrahydro-2H-indole-1,3,-diones, and their production and use. 4,709,049, Cl. 548-513.000.

Nagano, Yoshinobu, to Yamanouchi Pharmaceutical Co., Ltd. Glutathione monoalkyl ester sulfates and process for producing the same. 4,709,013, Cl. 530-332.000.

Nagase, Fumio: *See*—
Enami, Katsuya; Kawamura, Sinobu; Nagase, Fumio; and Aikawa, Shinichi, 4,709,285, Cl. 360-104.000.

Nagase, Yukio: *See*—
Hosono, Nagao; Nagase, Yukio; Takeuchi, Tatsuo; Egami, Hidemi; and Satomura, Hiroshi, 4,709,298, Cl. 361-213.000.

Nagashima, Masasumi: *See*—
Uchikata, Yoshio; Nozaki, Mineo; Nagashima, Masasumi; and Asakura, Osamu, 4,709,242, Cl. 346-76.0PH.

Nagatomo, Shigemi: *See*—
Hayano, Makoto; Nagatomo, Shigemi; Sakata, Hirotsugu; Hatori, Mitsuo; and Hattori, Hitoshi, 4,708,607, Cl. 418-55.000.

Nagl, Michael; Fugger, Gerhard; Mraz, Jaroslav; Mailander, Horst; Rottenmanner, Ernst; Rauber, Norbert; and Luger, Wolfgang, to Voest-Alpine Aktiengesellschaft. Apparatus for charging a shaft furnace for burning carbonaceous material. 4,708,643, Cl. 432-95.000.

Nagy, Mihaly: *See*—
Kosnives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Nagy, Mihaly; and Bacskai, Gyorgy, 4,708,733, Cl. 71-94.000.

Nailon, Wayne M. Portable bag storage assembly. 4,708,243, Cl. 206-315.110.

Naiman, Michael I.; Schield, John A.; and Cunningham, Lawrence J., to Petrolite Corporation. Cold flow improver and method of use thereof. 4,708,993, Cl. 525-356.000.

Naito, Takayuki: *See*—
Iimura, Seiji; Abe, Yoshio; Okumura, Jun; Naito, Takayuki; and Kamachi, Hajime, 4,708,955, Cl. 514-202.000.

Najjar, Mitri S.: *See*—
Vasconcellos, Stephen R.; Najjar, Mitri S.; and McKeon, Ronald J., 4,708,819, Cl. 252-373.000.

Nakagaki, Akitsuna: *See*—
Yogo, Takeji; Nakagaki, Akitsuna; Miyazawa, Akio; Mitomo, Takeshi; and Ichihara, Takayuki, 4,708,199, Cl. 165-167.000.

Nakagawa, Hiroshi, to Shinko Electric Co., Ltd. Magnetic pole pieces for using in linear pulse motor. 4,709,174, Cl. 310-12.000.

Nakagawa, Hiroshi, to Shinko Electric Co., Ltd. Linear pulse motor. 4,709,175, Cl. 310-12.000.

Nakagawa, Kenichi: *See*—
Ishii, Yutaka; Nakagawa, Kenichi; and Funada, Fumiaki, 4,708,439, Cl. 350-331.00R.

Nakagawa, Yoshimasa: *See*—
Banno, Shigeki; Oshibe, Yoshihiro; and Nakagawa, Yoshimasa, 4,708,982, Cl. 525-92.000.

Nakagawara, Chikashi: *See*—
Itakura, Tetsuro; Kasagi, Yoshitaka; Koyama, Mikio; and Nakagawara, Chikashi, 4,709,408, Cl. 455-260.000.

Nakagome, Yoshinobu; Aoki, Masakazu; Horiguchi, Masashi; Shimohigashi, Katsuhiro; and Ikenaga, Shinichi, to Hitachi, Ltd. Semiconductor memory using multiple level storage structure. 4,709,350, Cl. 365-45.000.

Nakai, Taiichiro: *See*—
Ejiri, Yoshihiro; Nagai, Akira; Nakai, Taiichiro; and Niiro, Yasuhiko, 4,708,427, Cl. 350-96.200.

Nakaishi, Takafumi: *See*—
Hojo, Takeshi; and Nakaishi, Takafumi, 4,708,024, Cl. 74-5.470.

Nakajima, Susumu: *See*—
Sakata, Isao; Nakajima, Susumu; Koshimuzi, Koichi; Samejima, Natsuki; Inohara, Kazumi; and Takata, Hiroyuki, 4,709,022, Cl. 540-145.000.

Nakamura, Akira; Oinoue, Hiroshi; Ishida, Tomoyuki; and Shintani, Kenji, to Sony Corporation. Coma correction in optical head with astigmatism for focusing error detection. 4,709,139, Cl. 250-201.000.

Nakamura, Hajime; Iwase, Masanori; Ichise, Eiji; Moriya, Takaharu; and Maruhashi, Shigeaki, to Nisshin Steel Co., Ltd. Apparatus for the determination of silicon in molten metal. 4,708,783, Cl. 204-423.000.

Nakamura, Kaoru; Sakata, Shinji; Ochiai, Chiaki; Furuta, Yoichi; and Tsubouchi, Kaoru, to Aisin Seiki Kabushiki Kaisha. Master cylinder. 4,707,989, Cl. 60-589.000.

Nakamura, Ko: *See*—
Ienaga, Kazuharu; Nakamura, Ko; and Ishii, Akira, 4,708,954, Cl. 514-183.000.
Ienaga, Kazuharu; and Nakamura, Ko, 4,708,961, Cl. 514-423.000.

Nakamura, Toru; Konishi, Satoshi; Yamada, Seiji; Tatsuoka, Masahiko; and Kubo, Michihiro, to Ishida Scales Manufacturing Company, Ltd. Automatic weighing system. 4,708,215, Cl. 177-25.000.

Nakamura, Toshio: *See*—
Sasaki, Yutaka; Kiyomiya, Yutaka; and Nakamura, Toshio, 4,709,070, Cl. 558-322.000.
Sasaki, Yutaka; Kiyomiya, Yutaka; and Nakamura, Toshio, 4,709,071, Cl. 558-322.000.

Nakano, Mitusou, to Mazda Motor Corporation. Rear body structure for motor vehicle. 4,708,391, Cl. 296-204.000.

Nakano, Tasuku; Kouno, Kazuo; Hibino, Kazunari; and Sakurai, Masashi, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Apparatus for controlling seatbelt system. 4,708,365, Cl. 280-801.000.

Nakano, Yoshiyuki: *See*—
Hosoda, Yuji; Honma, Kazuo; Fujie, Masakatsu; Iwamoto, Taro; Kamejima, Kohji; and Nakano, Yoshiyuki, 4,709,342, Cl. 364-558.000.

Nakasima, Matao: *See*—
Kawabe, Ryoichi; Iwasaki, Tetsuo; Kozuru, Hiroshi; Yoda, Masashi; Matsunaga, Masakazu; Takamori, Takesi; and Nakasima, Matao, 4,707,867, Cl. 4-313.000.

Namiki, Mitsuo; Osawa, Toshihiko; Fukuda, Yasuko; and Ozaki, Tat-

suhiko, to Takemoto Yushi Kabushiki Kaisha. Method of producing phenol-type natural antioxidative materials from processed sesame seed products. 4,708,820, Cl. 252-398.000.

Nanjyo, Hirotoshi; and Suzuki, Hidetoshi, to Kokusan Denki Co. Ltd. Electronic governor for an internal combustion engine. 4,708,112, Cl. 123-357.000.

Narayanan, Venkatachala L.: *See—*
Baker, David C.; Hand, Elli S.; Haugwitz, Rudiger D.; Narayanan, Venkatachala L.; and Rampal, Jang B., 4,709,033, Cl. 544-336.000.

Narisoko, Minoru; and Inoue, Satoshi, to Ishikawajima-Harima Heavy Industries Co., Ltd. Method of catalystless denitrification for fluidized bed incinerators. 4,708,067, Cl. 110-245.000.

Narita, Katsushi: *See—*
Ohta, Hiromi; Ogawa, Shinji; Kajikawa, Yosiharu; Fukumura, Keiichi; Tsuchiya, Kiyomitsu; Kittaka, Kiyoshi; and Narita, Katsushi, 4,707,999, Cl. 62-474.000.

Nash, Michael A.: *See—*
Flavell, John; Nash, Michael A.; and Tubb, Anthony B., 4,708,334, Cl. 271-182.000.

National Distillers and Chemical Corporation: *See—*
Cahill, Joseph, Jr.; and Rodenberg, Herbert G., 4,709,058, Cl. 549-267.000.

National Research Development Corporation: *See—*
Deane, Graham; and Weightman, Barry O., 4,708,717, Cl. 604-35.000.

National Research Laboratories: *See—*
Maurer, Gerald L., 4,708,864, Cl. 424-49.000.

National Semiconductor Corp.: *See—*
Li, Gabriel M. Y., 4,709,170, Cl. 307-511.000.

Natronag Gesellschaft fuer Verpackungssysteme mbH: *See—*
Spiess, Joachim, 4,708,216, Cl. 177-160.000.

Nauchno-Issledovatelsky Institut Stroitelstva I Arkhitektury: *See—*
Mkhikian, Robert M.; Shaginian, Suren G.; Markarian, Temur G.; Khaidukov, Georgy K.; Velidzhanian, Sofia V.; Manukian, Artashes R.; Karapetian, Artur K.; Kazarian, Aram V.; and Airapetian, Robert R., 4,708,628, Cl. 425-406.000.

Naucler, Lars Olof V.: *See—*
Larsson, Lars-Ake L.; Nilsson, Ake W.; Johannson, Bo Ingemar W.; and Naucler, Lars Olof V., 4,708,714, Cl. 604-5.000.

Navistar International Transportation Corp.: *See—*
Schmid, Karl J., 4,708,102, Cl. 123-90.350.

NCR Corporation: *See—*
Bangs, Richard G.; and Grey, Michael O., 4,708,500, Cl. 400-120.000.
Rohr, Lorenz, 4,708,312, Cl. 248-280.100.

NEA Technologies, Inc.: *See—*
Lockwood, Hanford N., Jr., 4,708,159, Cl. 137-340.000.

NEC Corporation: *See—*
Kage, Kouzou, 4,709,376, Cl. 375-58.000.
Shimizu, Toshimitsu, 4,709,386, Cl. 379-24.000.
Suzuki, Norio, 4,709,257, Cl. 358-23.000.
Tamura, Yoshiharu; and Kimura, Katsuji, 4,709,404, Cl. 455-126.000.
Yajima, Seiichi, 4,709,325, Cl. 364-200.000.
Yamaguti, Yukio, 4,709,301, Cl. 361-387.000.

Nederlandse Centrale Organisatie voor Toegepast-Natuurwe-Tenschappelijk Onderzoek: *See—*
De Wit, Jan B., 4,708,287, Cl. 237-8.00R.

Neeff, Rutger: *See—*
Rolf, Meinhard; Neeff, Rutger; and Muller, Walter, 4,709,019, Cl. 534-655.000.

Neier, Wilhelm: *See—*
Osterburg, Gunther; Gluzek, Karl-Heinz; and Neier, Wilhelm, 4,709,106, Cl. 568-917.000.

Neiheisel, Gary L., to Armco Inc. Method and apparatus for measuring wear in the lining of refractory furnaces. 4,708,482, Cl. 356-376.000.

Neil, Jeffrey T.: *See—*
Bandyopadhyay, Gautam; French, Kenneth W.; Bowen, Leslie J.; and Neil, Jeffrey T., 4,708,838, Cl. 264-63.000.

Nelson, Donald C. Fish rod transport clamp. 4,707,892, Cl. 24-336.000.

Nelson, Larry A., to Fisher Scientific Company. Analysis system. 4,708,886, Cl. 422-72.000.

Nelson, Leonard; and Barresi, Anthony J., to RCA Corporation. Apparatus and method for applying solder flux to a printed circuit board. 4,708,281, Cl. 228-180.100.

Nelson, Richard V.; and Stephen, John F., to ICI Americas Inc. Preparation of 2-halo-5-methylpyridines from 4-methyl-4-pentene derivatives. 4,709,063, Cl. 549-561.000.

Nestlen, Wolfgang; and Rudolf, Reiner, to Hengstler GmbH Geschaftsbereich Haller-Relais. Small-size switching relay in miniature embodiment. 4,709,219, Cl. 335-129.000.

Neukam, Christian: *See—*
Schmidt, Gerhard; Neukam, Christian; and Schmidt, Heinrich, 4,708,795, Cl. 210-304.000.

Neumann, John E.: *See—*
Graham, John J., Jr.; Huber, Joseph C., Jr.; and Neumann, John E., 4,709,235, Cl. 342-10.000.

Neumann, Ulrich: *See—*
Rauscher, Elli; Schaich, Eugen; Neumann, Ulrich; Wahlefeld, August; Gruber, Wolfgang; and Empl, Bernhard, 4,709,020, Cl. 536-17.800.

New Holland Inc.: *See—*
Knepper, Larimer J., 4,707,972, Cl. 56-10.200.

Newbery, Desmond; and Pickford, Terry A., to Baker Perkins PLC. Creaming apparatus. 4,708,054, Cl. 99-450.400.

Newman, Arnold L.; and Stanbro, William D., to Johns Hopkins University, The. Regulation of the exposure of active surfaces. 4,708,765, Cl. 156-626.000.

Newman, Stephen, to Minnesota Mining and Manufacturing Company. Photosolubilizable compositions containing novolac phenolic resin. 4,708,925, Cl. 430-270.000.

NGK Insulators, Ltd.: *See—*
Ozaki, Sei; and Futamura, Shoji, 4,707,904, Cl. 29-445.000.
Yokoi, Shigeo; Isozaki, Takashi; Yamamoto, Ryuta; and Kawaguchi, Toshiyuki, 4,709,330, Cl. 364-400.000.

Ngo, Khai D. T.; and Peterson, William A., to General Electric Company. Single-ended DC-to-DC converter with lossless switching. 4,709,316, Cl. 363-21.000.

Nicholas, John D.; Petree, Larry M.; and Attaway, Julian J., to MM Systems Corporation. Compression seal. 4,708,517, Cl. 404-64.000.

Nicol, David A.: *See—*
Miller, Thomas J.; and Nicol, David A., 4,708,726, Cl. 65-3.120.

Nielsen, Darryl M.: *See—*
Wheeler, Charles F.; and Nielsen, Darryl M., 4,709,124, Cl. 174-65.00R.

Nielsen, Darryl N.; and Wheeler, Charles F., to Marley-Wylain Company, The. Roll-formed submersible pump. 4,708,589, Cl. 415-199.200.

Nifco, Inc.: *See—*
Mitomi, Seiji, 4,708,306, Cl. 248-74.300.
Mizusawa, Akira, 4,708,895, Cl. 428-31.000.

Nihon Radiator Co., Ltd.: *See—*
Fukazawa, Tetsuo; and Yokoyama, Shigeyoshi, 4,708,585, Cl. 415-72.000.
Sugita, Terumitsu; Shinozuka, Hideo; and Murayama, Koji, 4,708,598, Cl. 417-295.000.

Nihon Tokushu Noyaku Seizo K.K.: *See—*
Kurahashi, Yoshio; Shiokawa, Kozo; Goto, Toshio; Kagabu, Shinzo; Matsumoto, Noboru; and Moriya, Koichi, 4,708,953, Cl. 514-166.000.

Niigata Engineering Co., Ltd.: *See—*
Hamada, Shuji; and Yamamoto, Akira, 4,708,582, Cl. 414-786.000.

Niikura, Kazuo: *See—*
Shinmei, Katsumasa; and Niikura, Kazuo, 4,708,594, Cl. 417-53.000.

Niiro, Yasuhiko: *See—*
Ejiri, Yoshihiro; Nagai, Akira; Nakai, Taiichiro; and Niiro, Yasuhiko, 4,708,427, Cl. 350-96.200.

Nijenhuis, Harry, to Hydro Mecanique Research S.A. Silo. 4,708,569, Cl. 414-332.000.

Nilsson, Ake W.: *See—*
Larsson, Lars-Ake L.; Nilsson, Ake W.; Johannson, Bo Ingemar W.; and Naucler, Lars Olof V., 4,708,714, Cl. 604-5.000.

Ninomiya, Ichiro; Kizu, Soujiro; and Sasboh, Hidehiko, to Sony Corporation. Editing data converting apparatus. 4,709,277, Cl. 360-14.300.

Ninomiya, Susumu: *See—*
Arima, Takahisa; Ninomiya, Susumu; Horikawa, Yuji; and Aoki, Tadasi, 4,708,372, Cl. 285-150.000.

Nippon Air Brake Co., Ltd.: *See—*
Akamatsu, Osamu, 4,708,158, Cl. 137-315.000.
Kanda, Osamu, 4,708,402, Cl. 303-20.000.
Sugiyama, Kiyoaki, 4,708,695, Cl. 474-101.000.

Nippon Chemi-Con Corporation: *See—*
Shinozaki, Fumihiko; and Yokoyama, Yutaka, 4,708,811, Cl. 252-62.200.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Kanazawa, Kyoetsu; and Ono, Mitsuo, 4,708,047, Cl. 84-385.00P.
Kozuki, Koichi, 4,708,046, Cl. 84-1.030.

Nippon Kayaku Kabushiki Kaisha: *See—*
Someno, Tetsuya; Kato, Kazuo; Takahashi, Yasushi; Ishii, Shinichi; Takeuchi, Tomio; and Umezawa, Hamao, 4,708,944, Cl. 502-7.000.

Nippon Kogaku K. K.: *See—*
Fujiu, Takamitsu; Mochida, Masaaki; and Ogino, Makoto, 4,708,652, Cl. 433-201.100.

Nippon Kokan Kabushiki Kaisha: *See—*
Ohta, Harutaka; Miyamoto, Kazuchiyo; Terayama, Arataro; Maruhashi, Seiji; and Gohdo, Shigeru, 4,708,082, Cl. 114-230.000.

Nippon Oil and Fats Co., Ltd.: *See—*
Banno, Shigeki; Oshibe, Yoshihiro; and Nakagawa, Yoshimasa, 4,708,982, Cl. 525-92.000.
Sumida, Seizi; Ono, Kaichi; Yoshida, Kazuo; and Yamada, Tomozo, 4,709,057, Cl. 549-262.000.

Nippon Petrochemicals Company, Limited: *See—*
Shimizu, Isoo; Matsumura, Yasuo; and Inomata, Yoshihisa, 4,709,089, Cl. 562-494.000.

Nippon Piston Ring Co., Ltd.: *See—*
Urano, Shigeru, 4,708,029, Cl. 74-567.000.

Nippon Sheet Glass Co., Ltd.: *See—*
Nishii, Junji; and Yamagishi, Takashi, 4,708,942, Cl. 501-40.000.

Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See—*
Nishibayashi, Hideyuki; Iio, Shigeyoshi; Watanabe, Fumio; and Goto, Takakiyo, 4,709,090, Cl. 562-537.000.
Ohata, Tomohisa; Terui, Sadao; and Shiraishi, Eiichi, 4,708,946, Cl. 502-304.000.

Nippon Suisan Kaisha, Ltd.: *See—*
Matsumoto, Tadao; and Inazuma, Sunso, 4,708,055, Cl. 99-484.000.

Nippon Telegraph & Telephone Corporation: *See—*
Kakii, Toshiaki; Matsuno, Koichiro; Suzuki, Shuzo; Ashiya, Fumihiro; and Ishihara, Koushi, 4,708,433, Cl. 350-96.220.

Nippon Zoki Pharmaceutical Co., Ltd.: *See—*
Ienaga, Kazuharu; Nakamura, Ko; and Ishii, Akira, 4,708,954, Cl. 514-183.000.

Nippondenso Co., Ltd.: *See—*
Kuraoka, Hiroaki, 4,708,777, Cl. 204-1.00T.
Ohta, Hiromi; Ogawa, Shinji; Kajikawa, Yosiharu; Fukumura, Keiichi; Tsuchiya, Kiyomitsu; Kittaka, Kiyoshi; and Narita, Katsushi, 4,707,999, Cl. 62-474.000.
Shiozaki, Makoto; and Akahori, Ichiro, 4,708,111, Cl. 123-357.000.
Takagi, Kozi; Nomura, Ken; Hattori, Yoshiyuki; and Kamiya, Masahiko, 4,708,406, Cl. 303-115.000.
Takao, Mitsunori, 4,708,109, Cl. 123-339.000.
Nishibayashi, Hideyuki; Iio, Shigeyoshi; Watanabe, Fumio; and Goto, Takakiyo, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Method of production of oxydicarboxylic acid salts. 4,709,090, Cl. 562-537.000.
Nishida, Minoru: *See—*
Satoh, Susumu; Suzuki, Hideo; Obara, Takashi; Nishida, Minoru; and Hashimoto, Osamu, 4,708,748, Cl. 148-2.000.
Nishiguchi, Yasuo: *See—*
Ogawa, Motokazu; Nishiguchi, Yasuo; and Minami, Keijiro, 4,708,915, Cl. 428-698.000.
Nishii, Junji; and Yamagishi, Takashi, to Nippon Sheet Glass Co., Ltd. Chalcogenide glass. 4,708,942, Cl. 501-40.000.
Nishikawa, Takafumi: *See—*
Yamato, Akihiro; and Nishikawa, Takafumi, 4,708,115, Cl. 123-494.000.
Nishimatsu, Masaharu: *See—*
Ohtsuki, Akira; Konno, Ryozo; Kanoo, Nobumori; Sugai, Makio; Mihoya, Takashi; Kubota, Yuichi; Nishimatsu, Masaharu; Isobe, Yukihiro; Tanaka, Kazushi; and Shinoura, Osamu, 4,708,909, Cl. 428-425.900.
Nishimichi, Yoshito; Uya, Masaru; and Kaneko, Katsuyuki, to Matsushita Electric Industrial Co., Ltd. Integrated circuit having latch circuit with multiplexer selection function. 4,709,173, Cl. 307-243.000.
Nishimura, Akira: *See—*
Ohsawa, Yoshitaka; Shibata, Yutaka; Niwa, Shin-ichiro; Nishimura, Akira; and Uemiya, Takafumi, 4,708,833, Cl. 264-1.500.
Nishioka, Asaaki: *See—*
Sakai, Etsuo; Nishioka, Asaaki; Watanabe, Kiyosi; and Mino, Iwao, 4,708,626, Cl. 425-398.000.
Niskin, Shale J. Multiple sheave assembly with angled rollers. 4,708,321, Cl. 254-397.000.
Nissan Chemical Industries, Ltd.: *See—*
Takahashi, Yasuhiro; Arai, Kazutaka; Ohara, Yoshio; Matsumoto, Hiroo; and Tsuchiya, Syuuzi, 4,709,082, Cl. 560-105.000.
Nissan Motor Co., Ltd.: *See—*
Hara, Seinosuke; Ofuji, Hiromichi; Miisyo, Kazuyuki; Matsumoto, Yasuo; and Kato, Manabu, 4,708,101, Cl. 123-90.160.
Kondo, Nobuaki, 4,708,385, Cl. 296-65.00R.
Matsuda, Toshiro, 4,709,341, Cl. 364-550.000.
Tabata, Toshiyuki; Aikawa, Hiroshi; Fujiwara, Yoshinari; and Yoda, Norio, 4,708,329, Cl. 267-140.100.
Tateoka, Yasuo; Uemura, Ryuzo; and Sagawa, Takatoshi, 4,708,908, Cl. 428-423.100.
Nisshin Steel Co., Ltd.: *See—*
Nakamura, Hajime; Iwase, Masanori; Ichise, Eiji; Moriya, Takaharu; and Maruhashi, Shigeaki, 4,708,783, Cl. 204-423.000.
Nitto Chemical Industry Co., Ltd.: *See—*
Sasaki, Yutaka; Kiyomiya, Yutaka; and Nakamura, Toshio, 4,709,070, Cl. 558-322.000.
Sasaki, Yutaka; Kiyomiya, Yutaka; and Nakamura, Toshio, 4,709,071, Cl. 558-322.000.
Niwa, Shin-ichiro: *See—*
Ohsawa, Yoshitaka; Shibata, Yutaka; Niwa, Shin-ichiro; Nishimura, Akira; and Uemiya, Takafumi, 4,708,833, Cl. 264-1.500.
NL Industries, Inc.: *See—*
Stroud, Stanley G., 4,708,204, Cl. 166-255.000.
Noakes, Larry R. Fence attachment. 4,708,323, Cl. 256-35.000.
Noggle, Kenneth G., to GTE Valeron Corporation. Rotating cutting tool holder for bit generation. 4,708,546, Cl. 409-200.000.
Nohmi Bosai Kogyo Co., Ltd.: *See—*
Otsuka, Hidenori, 4,709,229, Cl. 340-540.000.
Nomura, Ken: *See—*
Takagi, Kozi; Nomura, Ken; Hattori, Yoshiyuki; and Kamiya, Masahiko, 4,708,406, Cl. 303-115.000.
Nomura, Kohei, to Kabushiki Kaisha Osaka Jidoki Seisakusho. Method and apparatus for arranging capped capsules in a single direction. 4,708,233, Cl. 198-397.000.
Noon, Robert A.: *See—*
Kay, Ian T.; and Noon, Robert A., 4,709,038, Cl. 546-316.000.
Norand Corporation: *See—*
Koenck, Steven E.; and Hacker, David C., 4,709,202, Cl. 320-43.000.
Noranda Inc.: *See—*
Kitzinger, Frank; and Labuc, Vladimir M., 4,708,495, Cl. 374-154.000.
Norback, Per G., to Aktiebolaget Carl Munters. Contact body. 4,708,832, Cl. 261-153.000.
Norris, James E. Mail-call signal device. 4,708,286, Cl. 232-35.000.
North American Philips Lighting Corp.: *See—*
Dunn, John P.; Collins, Kent L.; and King, Norman R., 4,708,679, Cl. 445-26.000.
North Shore University Hospital: *See—*
Morrison, John; Siskind, Eric J.; and Frost, Meryll M., Jr., 4,709,332, Cl. 364-414.000.
Northeastern University: *See—*
Giese, Roger W., 4,709,016, Cl. 530-389.000.
Northern Telecom Limited: *See—*
Baxter, Gordon D.; and Grant, James C., 4,708,837, Cl. 264-40.400.
Baxter, Gordon D.; Grant, James C.; and Garner, John N., 4,708,887, Cl. 427-118.000.
Donaldson, Michael J.; Pue-Gilchrist, James D.; and Scott, James R., 4,708,430, Cl. 350-96.200.
Hung, Francis Y.; and Livermore, Frederick C., 4,709,296, Cl. 361-102.000.
Langenberg, Anthony J.; Chu, Pak-Jong; Moss, John S.; and Collar, Geoffrey A., 4,709,389, Cl. 379-424.000.
So, Vincent C.; Hughes, Richard P.; Vella, Paul J.; and Lamont, Jason B., 4,708,476, Cl. 356-73.100.
So, Vincent C.; Vella, Paul J.; Clegg, David D.; and Hughes, Richard P., 4,709,414, Cl. 455-607.000.
Northwestern University: *See—*
Marhic, Michel, 4,708,424, Cl. 350-96.160.
Norton Company: *See—*
Rukovena, Frank, Jr., 4,708,856, Cl. 423-242.000.
Noto, Yasuo; and Sugimoto, Shun-ichiro, to Hitachi, Ltd.; and Fuji Heavy Industries, Ltd. Power steering control apparatus. 4,708,220, Cl. 180-142.000.
Nowak, Dieter, to Klockner-Becorit GmbH. Coal shaver. 4,708,396, Cl. 299-34.000.
Nownahal, Ali: *See—*
Elsworth, John K.; Nownahal, Ali; and Wilson, Kevin, 4,708,371, Cl. 285-13.000.
Nozaki, Mineo: *See—*
Uchikata, Yoshio; Nozaki, Mineo; Nagashima, Masasumi; and Asakura, Osamu, 4,709,242, Cl. 346-76.0PH.
Nugent, William A.; and Waller, Francis J., to Du Pont de Nemours, E. I., and Company. Cyclopropanation process. 4,709,085, Cl. 560-124.000.
Nugeyre, Marie-Therese: *See—*
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435-5.000.
Nukem GmbH: *See—*
Worner, Jorg, 4,709,119, Cl. 136-260.000.
Nunley, C. Lynn; and Tomaselli, Joe W., to Loadmaster Systems, Inc. Composite roof/roof deck assembly with polymeric membrane. 4,707,961, Cl. 52-408.000.
N.V. Weefautomaten Picanol: *See—*
Vandeweghe, Michel M. J.; Victoor, Johnny-Fredy-Maurice; and Lagache, Remi-Louis, 4,708,174, Cl. 139-448.000.
Nylund, Thomas W.: *See—*
Cowan, Carl E.; Lubinsky, Anthony R.; Nylund, Thomas W.; Specht, Malcolm R.; and Spence, John P., 4,708,459, Cl. 355-4.000.
Oak Industries Inc.: *See—*
Hanas, Orest J.; Pennypacker, Frank C.; Radloff, Charles B.; and Schulman, Richard D., 4,709,266, Cl. 380-20.000.
Oba, Koichiro, to Hamamatsu Photonics Kabushiki Kaisha. High speed light detection tube. 4,709,140, Cl. 250-207.000.
Obara, Takashi: *See—*
Satoh, Susumu; Suzuki, Hideo; Obara, Takashi; Nishida, Minoru; and Hashimoto, Osamu, 4,708,748, Cl. 148-2.000.
Occelli, Mario L., to Union Oil Company of California. Process for the catalytic cracking of nitrogen-containing feedstocks. 4,708,786, Cl. 208-120.000.
Occidental Chemical Corporation: *See—*
Cotter, Byron R.; Lin, Henry C.; and Pawlak, Joseph A., 4,709,056, Cl. 549-246.000.
Ochiai, Chiaki: *See—*
Nakamura, Kaoru; Sakata, Shinji; Ochiai, Chiaki; Furuta, Yoichi; and Tsubouchi, Kaoru, 4,707,989, Cl. 60-589.000.
Ochiai, Hitoshi, to Seiko Instruments & Electronics Ltd. Power source circuit. 4,709,200, Cl. 320-1.000.
Ocvirk, Norbert: *See—*
Belart, Juan; Seibert, Wolfram; and Ocvirk, Norbert, 4,708,405, Cl. 303-114.000.
Seibert, Wolfram; Ocvirk, Norbert; and Schonlau, Juergen, 4,708,404, Cl. 303-114.000.
Odagawa, Kazuyoshi, to Canon Kabushiki Kaisha. Easily positionable keyboard. 4,709,128, Cl. 200-340.000.
Odorici, Franco, to Azionaria Costruzioni Macchine Automatiche-A.C.M.A. S.p.A. Apparatus for supplying flattened boxes to a packaging machine. 4,708,568, Cl. 414-330.000.
Oetiker, Hans. Pincer-like tool. 4,708,034, Cl. 81-9.300.
Offutt, Elmer B.: *See—*
Hambleton, Larry G.; Sears, Claude L.; and Offutt, Elmer B., 4,708,153, Cl. 134-170.000.
Ofuji, Hiromichi: *See—*
Hara, Seinosuke; Ofuji, Hiromichi; Miisyo, Kazuyuki; Matsumoto, Yasuo; and Kato, Manabu, 4,708,101, Cl. 123-90.160.
Ogasa, Michio: *See—*
Sakane, Toshihiko; and Ogasa, Michio, 4,709,220, Cl. 335-214.000.
Ogata, Yasuji: *See—*
Goto, Hisashi; and Ogata, Yasuji, 4,708,443, Cl. 350-427.000.
Ogawa, Motokazu; Nishiguchi, Yasuo; and Minami, Keijiro, to Kyocera Corporation. Thermal head for thermal recording. 4,708,915, Cl. 428-698.000.
Ogawa, Shinji: *See—*
Ohta, Hiromi; Ogawa, Shinji; Kajikawa, Yosiharu; Fukumura, Keiichi; Tsuchiya, Kiyomitsu; Kittaka, Kiyoshi; and Narita, Katsushi, 4,707,999, Cl. 62-474.000.

Ogawa, Takashi; Shirogami, Tamotsu; and Murata, Kenji, to Kabushiki Kaisha Toshiba. Molten carbonate fuel cell. 4,708,916, Cl. 429-38.000.

Ogino, Makoto: *See*—
Fujiu, Takamitsu; Mochida, Masaaki; and Ogino, Makoto, 4,708,652, Cl. 433-201.100.

Ogo, Kazutaka; Hayashi, Masahiro; Suzuki, Takatoshi; Hokao, Katsuiku; Asai, Akio; and Tsuruhashi, Takayuki, to Kabushiki Kaisha Toyota Chuo Kenkyusho; and Toyota Jidosha Kabushiki Kaisha. High-speed machining controller. 4,709,198, Cl. 318-571.000.

Ohara, Yoshio: *See*—
Takahashi, Yasuhiro; Arai, Kazutaka; Ohara, Yoshio; Matsumoto, Hiroo; and Tsuchiya, Syuuzi, 4,709,082, Cl. 560-105.000.

Ohashi, Keiichi, to Skylite Industry Co., Ltd. Switch structures in portable flashlights. 4,709,310, Cl. 362-205.000.

Ohashi, Mashato: *See*—
Tanaka, Tsuneo; Yoshitomi, Tetsuro; Hanada, Koji; Ohashi, Mashato; and Hikosaka, Michichika, 4,708,903, Cl. 428-195.000.

Ohashi, Yoichi: *See*—
Hirata, Tadashi; Matsukuma, Ikuo; Yoshiie, Shigeo; Sato, Kiyoshi; and Ohashi, Yoichi, 4,708,956, Cl. 514-210.000.

Ohata, Tomohisa; Terui, Sadao; and Shiraishi, Eiichi, to Nippon Shokubai KagAKU Kogyo Co., Ltd. Catalyst for purifying exhaust gas. 4,708,946, Cl. 502-304.000.

Ohhara, Minoru: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,708,950, Cl. 514-42.000.

Ohira, Tadashi: *See*—
Ueda, Masahide; and Ohira, Tadashi, 4,708,458, Cl. 355-3.0DD.

Ohkuma, Hiroaki: *See*—
Konishi, Masataka; Saitoh, Kyoichiro; Ohkuma, Hiroaki; and Kawaguchi, Hiroshi, 4,708,872, Cl. 424-115.000.

Ohmori, Takashi: *See*—
Takahashi, Haruhiko; Inui, Toshiharu; Saitoh, Hiroyuki; Ishikawa, Noriyoshi; Funato, Hitoshi; Ohmori, Takashi; Kurata, Masami; and Katou, Yasuo, 4,709,149, Cl. 250-317.100.

Ohmura, Yoshio: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,708,950, Cl. 514-42.000.

Ohnishi, Kazuyuki: *See*—
Okuda, Masakiyo; and Ohnishi, Kazuyuki, 4,708,461, Cl. 355-14.00R.

Oho, Shigeru: *See*—
Sasayama, Takao; Oho, Shigeru; Kanke, Atsushi; Shibata, Takanori; and Endo, Akira, 4,708,480, Cl. 356-350.000.

Ohsaka, Yohnosuke; and Takaki, Shoji, to Daikin Industrier, Ltd. Substituted trifluorooxetanes. 4,709,060, Cl. 549-511.000.

Ohsawa, Yoshitaka; Shibata, Yutaka; Niwa, Shin-ichiro; Nishimura, Akira; and Uemiya, Takafumi, to Sumitomo Electric Industries, Ltd. Method for producing elastomeric optical fiber. 4,708,833, Cl. 264-1.500.

Ohta, Harutaka; Miyamoto, Kazuchiyo; Terayama, Arataro; Maruhashi, Seiji; and Gohdo, Shigeru, to Nippon Kokan Kabushiki Kaisha. Mooring apparatus. 4,708,082, Cl. 114-230.000.

Ohta, Hiromi; Ogawa, Shinji; Kajikawa, Yoshiharu; Fukumura, Keiichi; Tsuchiya, Kiyomitsu; Kittaka, Kiyoshi; and Narita, Katsushi, to Nippondenso Co., Ltd. Receiver for refrigerant apparatus. 4,707,999, Cl. 62-474.000.

Ohtake, Yasuhisa: *See*—
Kanto, Masaharu; Akiyoshi, Eiichi; and Ohtake, Yasuhisa, 4,708,680, Cl. 445-47.000.

Ohtsuki, Akira; Konno, Ryozo; Kanno, Nobumori; Sugai, Makio; Mihoya, Takashi; Kubota, Yuichi; Nishimatsu, Masaharu; Isobe, Yukihiro; Tanaka, Kazushi; and Shinoura, Osamu, to Toyo Ink Mfg. Co., Ltd. Radiation-curable, magnetic coating material and magnetic recording medium using the same. 4,708,909, Cl. 428-425.900.

Oinoue, Hiroshi: *See*—
Nakamura, Akira; Oinoue, Hiroshi; Ishida, Tomoyuki; and Shintani, Kenji, 4,709,139, Cl. 250-201.000.

Ojio, Kuniji: *See*—
Taniguchi, Akira; Ojio, Kuniji; Yamamoto, Tatsuya; and Sana, Toshikazu, 4,708,761, Cl. 156-516.000.

Okabe, Kazuhiko: *See*—
Kubo, Makoto; Sotoya, Koshiro; and Okabe, Kazuhiko, 4,709,045, Cl. 548-352.000.

Okabe, Kazuo: *See*—
Yoshii, Toshiya; and Okabe, Kazuo, 4,708,905, Cl. 428-216.000.

Okada, Mikiro: *See*—
Kamuro, Setsufumi; and Okada, Mikiro, 4,709,168, Cl. 307-448.000.

Okamoto, Keiichi: *See*—
Komeyama, Yoshihiro; Kembo, Yukio; Kuni, Asahiro; Funatsu, Ryuuichi; Inagaki, Akira; Ikeda, Minoru; and Okamoto, Keiichi, 4,708,484, Cl. 356-401.000.

Okamoto, Kenji, to Diesel Kiki Co., Ltd. Electronic governor for internal combustion engines. 4,709,335, Cl. 364-431.050.

Okamoto, Masafumi: *See*—
Fujiwara, Makoto; Yoneda, Hajime; and Okamoto, Masafumi, 4,709,303, Cl. 361-433.000.

Okamoto, Shinji: *See*—
Fujii, Toshinori; and Okamoto, Shinji, 4,708,545, Cl. 409-131.000.

Okamoto, Taoashi: *See*—
Kadokura, Susumu; Sawayama, Ippei; Kato, Tomoaki; and Okamoto, Tadashi, 4,709,221, Cl. 336-200.000.

Okamoto, Tatsuo: *See*—
Shimizu, Masahiro; Okamoto, Tatsuo; and Tsukamoto, Katsuhiro, 4,708,904, Cl. 428-209.000.

Okamoto, Yasuo: *See*—
Tomita, Haruo; Okamoto, Yasuo; and Yonezawa, Kazuya, 4,709,062, Cl. 549-553.000.

Okamura, Hisashi; Kawamoto, Hiroshi; and Sakakibara, Yoshio, to Fuji Photo Film Co., Ltd. Photographic elements with development inhibitor precursor. 4,708,927, Cl. 430-564.000.

Okaya, Takuji: *See*—
Maruyama, Hitoshi; Ono, Isao; Kohno, Hiroji; Yamauchi, Junnosuke; and Okaya, Takuji, 4,708,947, Cl. 503-209.000.

Okazaki, Masanori, to Sharp Kabushiki Kaisha. Channel selecting panel holder for television set. 4,709,405, Cl. 455-151.000.

O'Keefe, Luke F.: *See*—
Zarchy, Andrew S.; Volles, Warren K.; and O'Keefe, Luke F., 4,709,116, Cl. 585-738.000.

OKI Electric Industry Co., Ltd.: *See*—
Kitazawa, Shooji, 4,709,352, Cl. 365-104.000.

Okuda, Masakiyo; and Ohnishi, Kazuyuki, to Sharp Kabushiki Kaisha. Copying machine with a reservation function. 4,708,461, Cl. 355-14.00R.

Okumura, Jun: *See*—
Iimura, Seiji; Abe, Yoshio; Okumura, Jun; Naito, Takayuki; and Kamachi, Hajime, 4,708,955, Cl. 514-202.000.

Okumura, Nobuo, to Aisin Seiki Kabushiki Kaisha. Cryogenic refrigerator. 4,708,725, Cl. 62-6.000.

Okumura, Norio: *See*—
Utsumi, Shigeo; Kanesaki, Tateo; Kagiyama, Takashi; Otonari, Satoshi; Ikushima, Koichiro; and Okumura, Norio, 4,708,902, Cl. 428-141.000.

Olimpio, Stocchiero. Lid and container for accumulators. 4,708,259, Cl. 220-306.000.

Olin Corporation: *See*—
Gammons, Robert C., 4,708,292, Cl. 239-414.000.
Tungatt, Paul D.; Tyler, Derek E.; and Cheskis, Harvey P., 4,708,740, Cl. 75-76.000.

Olsen, David E., to Rockwell International Corporation. Non-destructive testing of cooled detector arrays. 4,709,141, Cl. 250-211.00R.

Olsen, Willi: *See*—
Eggert, Horst; and Olsen, Willi, 4,709,291, Cl. 361-2.000.

Olson, Gary M., to Ganebac, Inc. Measurement of spine extension. 4,708,148, Cl. 128-781.000.

Olympus Optical Co., Ltd.: *See*—
Fujii, Toru; Takase, Hiroshi; and Imaizumi, Masaki, 4,708,442, Cl. 350-422.000.
Goto, Hisashi; and Ogata, Yasuji, 4,708,443, Cl. 350-427.000.
Goto, Hisashi, 4,708,445, Cl. 350-454.000.
Saito, Tatsuya, 4,708,136, Cl. 128-303.100.
Toda, Masato; and Yabe, Hisao, 4,708,126, Cl. 128-6.000.
Tsukagoshi, Tsuyoshi, 4,708,137, Cl. 128-303.150.

O'Mara, William E., Jr., to Harris Corporation. Dielectric for laser trimming. 4,708,747, Cl. 437-19.000.

Omori, Tatsuya: *See*—
Kato, Toshiji; and Omori, Tatsuya, 4,709,392, Cl. 381-193.000.

Omoto, Noriaki, to Matsushita Electric Industrial Co., Ltd. A.F.C. system for broad-band FM receiver. 4,709,406, Cl. 455-208.000.

Omron Tateisi Electronics Co.: *See*—
Yoshida, Shinya, 4,709,137, Cl. 235-379.000.

Onda, Takanori; and Kambe, Hirofumi, to Honda Giken Kogyo Kabushiki Kaisha. Centrifugal clutch. 4,708,231, Cl. 192-103.00F.

Onkyo Kabushiki Kaisha: *See*—
Kato, Toshiji; and Omori, Tatsuya, 4,709,392, Cl. 381-193.000.

Ono, Ichiro: *See*—
Yoshioka, Hiroshi; Ono, Ichiro; and Uehara, Hitoshi, 4,709,065, Cl. 556-428.000.

Ono, Isao: *See*—
Maruyama, Hitoshi; Ono, Isao; Kohno, Hiroji; Yamauchi, Junnosuke; and Okaya, Takuji, 4,708,947, Cl. 503-209.000.

Ono, Kaichi: *See*—
Sumida, Seizi; Ono, Kaichi; Yoshida, Kazuo; and Yamada, Tomozo, 4,709,057, Cl. 549-262.000.

Ono, Mitsuo: *See*—
Kanazawa, Kyoetsu; and Ono, Mitsuo, 4,708,047, Cl. 84-385.00P.

Ono, Naoya: *See*—
Yoshida, Kasumi; Takano, Nobuyoshi; and Ono, Naoya, 4,708,940, Cl. 436-45.000.

Ono, Toshiyuki: *See*—
Ishikuma, Mineyasu; Hasui, Hiroshi; and Ono, Toshiyuki, 4,708,881, Cl. 426-524.000.

Ooishi, Tadashi: *See*—
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Honkaniemi, Matti E.; Mustikka, Lauri A.; Jankkila, Martti J.; Hokkanen, Pentti O.; Heikkila, Risto M.; and Lilja, Launo L., 4,708,640, Cl. 432-14.000.
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Edgerton, Willie H., 4,708,541, Cl. 408-83.500.
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Pazandak, Bradford B. Rotating surgical cutting knife. 4,708,138, Cl. 128-305.000.
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Peters, Shelby L. Retractable trolling motor assembly. 4,708,670, Cl. 440-6.000.
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Liang, Yeon F., 4,708,983, Cl. 525-101.000.
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Dillard, John A., III, 4,708,791, Cl. 210-96.200.
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Poorten, Henri V., to Andromaque, S.A. Process of simultaneously printing and electroforming ceramic articles. 4,708,781, Cl. 204-180.900.
Popescu, Mircea C.; Weiner, Alan L.; and Carpenter-Green, Sharon S., to Liposome Company, Inc., The. Liposome-gel compositions. 4,708,861, Cl. 424-1.100.
Popovic, Mikulas: *See*—
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435–5.000.
Popowski, James J.; and Goldstein, Richard, to Questron, Inc. Color converter. 4,709,230, Cl. 340-703.000.
Porat, Thomas M., to Crathern Engineering Co., Inc. Edge locating device. 4,708,759, Cl. 156-360.000.
Posey, John L.; and Schmidt, Josef, to Baxter Travenol Laboratories, Inc. Replaceable knife and holder. 4,708,045, Cl. 83-604.000.
Posey, John T. Method of attaching tube to a tube holder. 4,707,906, Cl. 29-453.000.
Post, Friedhelm, to Alpha Maschinenbau AG. Bending device for the production of formed parts consisting of wire or strip sections. 4,708,009, Cl. 72-442.000.
Potter, William S., Jr. Outboard motor mounting device. 4,708,087, Cl. 114-352.000.
Potts, Lanny L. Stair climbing exercise apparatus. 4,708,338, Cl. 272-70.000.
Poullain, Michel; and Marcuard, Alain, to LMT Radio Professionnelle. Device for eliminating low frequency noise from a transmission system, in particular 1/f noise in a homodyne radar receiver. 4,709,237, Cl. 342-203.000.
Powell, Jeffrey M.: *See*—
Gephart, Don A.; and Powell, Jeffrey M., 4,709,318, Cl. 363-37.000.
Powers, Kerns H.: *See*—
Lechner, Bernard J.; and Powers, Kerns H., 4,709,256, Cl. 358-11.000.
Powers, Richard G.; Zeets, Joseph S.; Currier, Joseph G.; and Alley, Lewis F., to Marlen Research Corporation. Jet knife structure. 4,708,296, Cl. 241-82.200.
Powter, Edwin J.: *See*—
Fox, John R.; Powter, Edwin J.; and Ritchie, William K., 4,709,418, Cl. 455-612.000.
Pratt & Whitney Canada Inc.: *See*—
Elsworth, John K.; Nownahal, Ali; and Wilson, Kevin, 4,708,371, Cl. 285-13.000.
Preiner, Peter: *See*—
Loeffler, Herbert; and Preiner, Peter, 4,708,428, Cl. 350-96.200.
President and Fellows of Harvard College: *See*—
Collier, R. John; and Carroll, Stephen F., 4,709,017, Cl. 530-350.000.
Prisco, John J., to Warner Cable Communications, Inc. T-carrier fiber optic modem. 4,709,415, Cl. 455-607.000.
Procter & Gamble Company, The: *See*—
Hammond, Edward P., 4,708,630, Cl. 425-504.000.
Loocmans, Maurice E.; Matthews, Randall S.; and Miller, Joseph A., 4,708,966, Cl. 514-689.000.
Snyder, William E., 4,708,813, Cl. 252-90.000.
Protective Plastics Limited: *See*—
Molnar, Bela, 4,708,899, Cl. 428-60.000.
Protoned B.V.: *See*—
Walter, Herbert, 4,708,309, Cl. 248-218.400.
Pucel, Robert A.: *See*—
Tajima, Yusuke; and Pucel, Robert A., 4,709,410, Cl. 455-333.000.
Pue-Gilchrist, James D.: *See*—
Donaldson, Michael J.; Pue-Gilchrist, James D.; and Scott, James R., 4,708,430, Cl. 350-96.200.
Pujals, Charles, Jr. Cervical/occipital support. 4,708,129, Cl. 128-75.000.
Pulick, Michael A.: *See*—
Leydorf, George F., Jr.; and Pulick, Michael A., 4,708,105, Cl. 123-193.0CH.
Purvis, Gene; Phelps, Russell; and Dupler, Tim. Spraying method and apparatus. 4,708,088, Cl. 118-300.000.
Quantel Limited: *See*—
Taylor, Richard J.; Kellar, Paul R. N.; and Hinson, Neil R., 4,709,393, Cl. 382-41.000.
Quantum Logic Corporation: *See*—
Stein, Alexander, 4,708,493, Cl. 374-128.000.
Quentin, Jean-Pierre, to Rhone-Poulenc Recherches. Thermotropic aromatic polyesters. 4,709,005, Cl. 528-194.000.
Questek Corp.: *See*—
Perrine, James J., 4,708,339, Cl. 272-97.000.
Questron, Inc.: *See*—
Popowski, James J.; and Goldstein, Richard, 4,709,230, Cl. 340-703.000.
R. J. Reynolds Tobacco Company: *See*—
Shelar, Gary R., 4,708,151, Cl. 131-359.000.
Raddatz, Peter: *See*—
Holzemann, Gunter; Raddatz, Peter; Jonczyk, Alfred; and Schmitges, Claus J., 4,709,010, Cl. 530-323.000.
Rademaker, Gerrit; and van der Veer, Franciscus A. A., to U.S. Philips Corporation. Opto-electrical signal converter with stabilization. 4,709,154, Cl. 250-551.000.
Radloff, Charles B.: *See*—
Hanas, Orest J.; Pennypacker, Frank C.; Radloff, Charles B.; and Schulman, Richard D., 4,709,266, Cl. 380-20.000.
Raduchel, Bernd: *See*—
Skuballa, Werner; Raduchel, Bernd; Schwarz, Norbert; Vorbruggen, Helmut; Casals-Stenzel, Jorge; Schillinger, Ekkehard; and Town, Michael H., 4,708,963, Cl. 514-530.000.
Raetz, Warren V. Stabilizer device. 4,708,362, Cl. 280-763.100.
Rahm, Erik R., to Atlas Copco Aktiebolag. Pneumatic rotary tool. 4,708,210, Cl. 173-169.000.
Raith, Siegfried K., to Cameronics Technology Corporation, Ltd. Camera. 4,708,467, Cl. 355-53.000.
Ramer, O. Glenn: *See*—
Pikulski, Joseph L.; and Ramer, O. Glenn, 4,708,431, Cl. 350-96.200.
Ramos, Richard, to Rockwell International Corporation. Isolated controller circuit. 4,709,315, Cl. 363-21.000.
Rampal, Jang B.: *See*—
Baker, David C.; Hand, Elli S.; Haugwitz, Rudiger D.; Narayanan, Venkatachala L.; and Rampal, Jang B., 4,709,033, Cl. 544-336.000.
Ramtron Corporation: *See*—
Rohrer, George A.; and McMillan, Larry, 4,707,897, Cl. 29-25.420.
Rando, Joseph F.; and Koop, Dale E., to Spectra-Physics, Inc. Fast axial flow laser circulating system. 4,709,372, Cl. 372-58.000.
Rasmussen GmbH: *See*—
Sauer, Heinz, 4,708,375, Cl. 285-258.000.
Ratcliffe, Marvin E. Electrified fence gate. 4,708,322, Cl. 256-10.000.
Rath, Dieter; and Heitmeier, Rolf, to Intermedicat GmbH. Apparatus for hemodiafiltration. 4,708,802, Cl. 210-641.000.
Rauber, Norbert: *See*—
Nagl, Michael; Fugger, Gerhard; Mraz, Jaroslav; Mailander, Horst; Rottenmanner, Ernst; Rauber, Norbert; and Luger, Wolfgang, 4,708,643, Cl. 432-95.000.
Rauscher, Elli; Schaich, Eugen; Neumann, Ulrich; Wahlefeld, August; Gruber, Wolfgang; and Empl, Bernhard, to Boehringer Mannheim GmbH. Heptaose compounds and preparation thereof. 4,709,020, Cl. 536-17.800.
Rautakorpi, Paavo; Manttari, Risto; Liimatainen, Heikki; Pernu, Heikki; Tuomainen, Heikki; and Rusanen, Hannu, to OY Tampella AB. Apparatus and method for determining the properties of fiber pulp. 4,708,011, Cl. 73-63.000.
Rawitzer, John A.: *See*—
Wing, Ray D.; Lynch, Marine D.; Rawitzer, John A.; and Whitney, Mark D., 4,708,451, Cl. 354-312.000.
Rawle, Roger D.: *See*—
Twogood, Rodney L.; Wright, Raymond L.; and Rawle, Roger D., 4,707,900, Cl. 29-244.000.
Rawlings, Kelly R., to Anti-P, Inc. Fuel injected internal combustion engine pollutant control system. 4,708,118, Cl. 123-555.000.
Ray, O. Eugene. Swim through safety division line for pools. 4,707,869, Cl. 4-505.000.
Ray, Randy: *See*—
Piatt, Michael J.; Theodoras, James T., II; and Ray, Randy, 4,709,244, Cl. 346-140.00R.
Piatt, Michael J.; and Ray, Randy, 4,709,248, Cl. 346-140.00R.
Raychem Corporation: *See*—
Jansons, Viktors; and Gors, Heinrich C., 4,709,007, Cl. 528-222.000.
Raytheon Company: *See*—

Henlin, Dennis A., 4,709,346, Cl. 364-784.000.
Osepchuk, John M., 4,709,129, Cl. 219-10.55B.
Spencer, Gordon R., 4,709,261, Cl. 358-66.000.
Tajima, Yusuke; and Pucel, Robert A., 4,709,410, Cl. 455-333.000.

RCA Corporation: *See—*
Bednarz, James P.; and Freedman, David D., 4,709,370, Cl. 372-38.000.
Bessler, Roger F.; Arbeiter, James H.; and Sinniger, Joseph O., 4,709,394, Cl. 382-49.000.
Christopher, Lauren A., 4,709,226, Cl. 340-347.0DD.
Clark, David W.; and Freedman, Morton, 4,708,429, Cl. 350-96.200.
Dietz, Wolfgang F. W., 4,709,193, Cl. 315-408.000.
Kleinknecht, Hans P., 4,708,436, Cl. 350-162.170.
Lechner, Bernard J.; and Powers, Kerns H., 4,709,256, Cl. 358-11.000.
Nelson, Leonard; and Barresi, Anthony J., 4,708,281, Cl. 228-180.100.
Patterson, David R., 4,709,416, Cl. 455-609.000.
Sendelweck, Gene K., 4,709,267, Cl. 358-148.000.
Trantham, Dana C., 4,709,321, Cl. 363-56.000.

Rebel, Herbert: *See—*
Kunkel, Fred; and Rebel, Herbert, 4,707,902, Cl. 29-417.000.

Redman, Robert J., to Tube Fab of Afton Corporation. Bar feeding apparatus. 4,708,039, Cl. 82-2.500.

Reed, Lehman T. Top entry electrical transmission assembly for submersible pumping. 4,708,201, Cl. 166-65.100.

Regie Nationale des Usines Renault: *See—*
Banon, Louis; Lajoie-Mazenc, Michel; and Mathieu, Pierre, 4,709,179, Cl. 310-156.000.

Reheis Chemical Company, Inc.: *See—*
Ferentchak, Rudolph; Kozischek, James F.; and Schwartz, Jerome E., 4,708,967, Cl. 521-56.000.

Reid, Philip L.; and Lofton, Thomas S., Jr. Process and apparatus for covering articles with film. 4,708,242, Cl. 206-257.000.

Reifenhauser GmbH & Co. Maschinenfabrik: *See—*
Balk, Hermann, 4,708,619, Cl. 425-141.000.
Reifenhauser, Hans; Reitemeyer, Paul; Krumm, Klemens; and Beisemann, Heinz, 4,708,618, Cl. 425-133.500.

Reifenhauser, Hans; Reitemeyer, Paul; Krumm, Klemens; and Beisemann, Heinz, to Reifenhauser GmbH & Co. Maschinenfabrik. Extruder die for extrusion of a thermoplastic laminate. 4,708,618, Cl. 425-133.500.

Reijntjens, Wilhelmus J. M.: *See—*
Wouda, Kornelis J.; and Reijntjens, Wilhelmus J. M., 4,709,378, Cl. 375-110.000.

Reinecke, Paul: *See—*
Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hanssler, Gerd, 4,708,731, Cl. 71-90.000.

Reitemeyer, Paul: *See—*
Reifenhauser, Hans; Reitemeyer, Paul; Krumm, Klemens; and Beisemann, Heinz, 4,708,618, Cl. 425-133.500.

Reitsema, Harold J., to Ball Corporation. Optically coupled shaft angle encoder. 4,709,146, Cl. 250-231.0SE.

Remold, Heinz G., to Brigham & Women's Hospital. Purified migration inhibitory factor also having colony stimulating factor activity. 4,708,937, Cl. 435-188.000.

Renner, Alfred; and Vonlanthen, Christian, to Ciba-Geigy Corporation. Substituted unsaturated, sulfonyloxy group-containing bicyclic imides as catalysts for cationic polymerization. 4,709,047, Cl. 548-435.000.

Rentzea, Costin; Buschmann, Ernst; Himmele, Walter; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, to BASF Aktiengesellschaft. N-(arylpropyl)-azolylureas, and fungicides containing these compounds. 4,708,960, Cl. 514-383.000.

Research Corporation: *See—*
Suhadolnik, Robert J.; Wu, Joseph M.; Doetsch, Paul; and Henderson, Earl E., 4,708,935, Cl. 435-91.000.

Resource Technology Associates: *See—*
Coltrinari, Enzo L., 4,708,804, Cl. 210-677.000.

Rexnord Inc.: *See—*
Lorenz, Robert D., 4,708,483, Cl. 356-376.000.

Rey, Francoise: *See—*
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435-5.000.

Reye, Hans: *See—*
Sundermann, Erich; Laurien, Hanno; Vahlbrauk, Wolfgang; and Reye, Hans, 4,708,642, Cl. 432-95.000.

Reyna, Johnny F. Electrical connection. 4,708,418, Cl. 439-785.000.

Reynolds, Charles E.: *See—*
Himes, John L., Jr.; McCleerey, Earl W.; and Reynolds, Charles E., 4,708,412, Cl. 439-95.000.

Rheinmetall GmbH: *See—*
Bisping, Bernhard; Gersbach, Klaus; and Romer, Rudolf, 4,708,064, Cl. 102-517.000.
Schilling, Hartmut; Peller, Helmuth; and Becker, Hansjoerg, 4,708,065, Cl. 102-529.000.

Rhone-Poulenc Chimie: *See—*
Chevallier, Yvonick, 4,708,859, Cl. 423-339.000.

Rhone-Poulenc Recherches: *See—*
Quentin, Jean-Pierre, 4,709,005, Cl. 528-194.000.

Riblet, Robert L. Modular construction assembly for wall of court. 4,708,336, Cl. 272-3.000.

Rich, Jonathan D., to General Electric Company. Silylation method and organic silanes made therefrom. 4,709,054, Cl. 549-214.000.

Richter, Hanno; Mirsberger, Helmut; Uhlig, Raimer; Haage, Manfred; and Uebel, Philipp, to Hilti Aktiengesellschaft. Expansion dowel assembly. 4,708,551, Cl. 411-32.000.

Richter, Hans, to Blomberg Robotertechnik GmbH. Robot arm. 4,708,578, Cl. 414-720.000.

Ricoh Co., Ltd.: *See—*
Hashimoto, Mitsuru, 4,708,921, Cl. 430-70.000.
Sasaki, Masaomi, 4,709,096, Cl. 564-374.000.
Takemoto, Takeshi, 4,708,501, Cl. 400-157.200.

Ridley, William E.; and Spector, George. Magnetic battery. 4,709,176, Cl. 310-15.000.

Riedl, Kurt: *See—*
Ascher, Gerd; and Riedl, Kurt, 4,708,825, Cl. 2600-544.00N.

Riester, John B.: *See—*
Petry, Eston F.; and Riester, John B., 4,708,395, Cl. 299-17.000.

Rieter Machine Works, Ltd.: *See—*
Graber, Werner; and Slavik, Walter, 4,707,976, Cl. 57-263.000.

Rigsby, Donald R.: *See—*
Palentyn, Gunther H.; Dehlinger, James R.; and Rigsby, Donald R., 4,708,390, Cl. 276-188.000.

Riis, Voldemar, to Vargarda Armatur AB. Device at mixing valves. 4,708,172, Cl. 137-625.170.

Rijksuniversiteit Groningen: *See—*
De Haan, Pieter; Lerk, Coenraad F.; and Schoonen, Adelbert J. M., 4,708,874, Cl. 424-470.000.

Rikagaku Kenkyusho: *See—*
Sawada, Tadashi; Ikegami, Tatsuji; and Iguchi, Masashi, 4,708,586, Cl. 415-72.000.

Rinehart, William M.: *See—*
Hoyt, Robert M.; Dziedzic, Edward; and Rinehart, William M., 4,707,964, Cl. 52-742.000.

Rippe, Dondeville M., to Magnum Piering, Inc. Process and apparatus for stabilizing foundations. 4,708,528, Cl. 405-230.000.

Ritchie, William K.: *See—*
Fox, John R.; Powter, Edwin J.; and Ritchie, William K., 4,709,418, Cl. 455-612.000.

Robbe & Berking GmbH & Co. KG: *See—*
Hosak-Robb, Barbara, 4,707,922, Cl. 30-322.000.

Robbins, Michael S.: *See—*
Seymour, Herbert E.; and Robbins, Michael S., 4,709,412, Cl. 455-603.000.

Robbins, R. Ralph. Air to air heat exchanger. 4,708,197, Cl. 165-54.000.

Robecchi, Edoardo; and Dell'Orto, Renato, to Industrie Pirelli S.p.A. V-belt of controlled extensibility and relative transmission. 4,708,702, Cl. 474-261.000.

Robert Bosch GmbH: *See—*
Burger, Kurt; Friedrich, Heinz; Molkner, Thomas; and Schottle, Peter, 4,708,769, Cl. 156-659.100.
Doderer, Gerhard; Kiefer, Heinz; and Krieger, Willi, 4,708,706, Cl. 493-295.000.
Gehrmann, Rainer, 4,709,192, Cl. 315-371.000.
Guntert, Josef; Hafele, Walter; and Tschoke, Helmut, 4,708,114, Cl. 123-449.000.
Palm, Volker; and Pfuhl, Berthold, 4,708,596, Cl. 417-218.000.

Roberts, David L., to Shell Internationale Research Maatschappij, B.V. Fume extractor device. 4,708,177, Cl. 141-93.000.

Roberts, Victor D., to General Electric Company. Operation of standby filament associated with an AC arc discharge lamp ballast. 4,709,188, Cl. 315-178.000.

Robin, Jacques A.: *See—*
Cousin, Jean-Claude; and Robin, Jacques A., 4,707,977, Cl. 57-297.000.

Robinson, Anthony L.: *See—*
Wake, David E.; Robinson, Anthony L.; and Croset, Michel R., 4,708,335, Cl. 271-187.000.

Robinson Industries, Inc.: *See—*
Banyay, H. Daniel, 4,708,593, Cl. 416-183.000.

Robinson, John T., to International Business Machines Corporation. General locking/synchronization facility with canonical states and mapping of processors. 4,709,326, Cl. 364-200.000.

Robinton, Michael A.; and Starkie, Alan H., to Robinton Products, Inc. Digital phase selection system for signal multipliers. 4,709,375, Cl. 375-27.000.

Robinton Products, Inc.: *See—*
Robinton, Michael A.; and Starkie, Alan H., 4,709,375, Cl. 375-27.000.

Roblin, Pierre: *See—*
Picard, Didier; and Roblin, Pierre, 4,708,251, Cl. 212-182.000.

Roche, Cyril J. Removable tray apparatus for a walker. 4,708,274, Cl. 224-273.000.

Roche, Joseph R.; and Lin, Shaw-Wen, to Hydril Company. Fatigue resistant coupling for tubular members. 4,708,513, Cl. 403-361.000.

Roche, William J., to GTE Products Corporation. Lamp with lead wire thermal switch. 4,709,187, Cl. 315-74.000.

Rock, Henry L. Alcohol outdoor portable stove and accessories. 4,708,122, Cl. 126-43.000.

Rockwell International Corporation: *See—*
Gillon, Willard A., Jr., 4,707,983, Cl. 60-258.000.
Kinoshita, Roy Y., 4,709,160, Cl. 307-253.000.
Meng, Sea Y., 4,708,584, Cl. 415-53.00R.
Olsen, David E., 4,709,141, Cl. 250-211.00R.
Ramos, Richard, 4,709,315, Cl. 363-21.000.
Wagner, William R., 4,707,981, Cl. 60-242.000.
Wagner, William R., 4,707,982, Cl. 60-258.000.

Rodenberg, Herbert G.: *See—*
Cahill, Joseph, Jr.; and Rodenberg, Herbert G., 4,709,058, Cl. 549-267.000.

Rodewald, Paul G., to Mobil Oil Corporation. Catalytic conversion with boron trifluoride treated zeolite. 4,709,110, Cl. 585-463.000.

Rodewald, Paul G.; and Valyocsik, Ernest W., to Mobil Oil Corporation. Catalytic oxygenate conversion. 4,709,114, Cl. 585-640.000.

Rodgers, Jack L. Anti-skid coating composition. 4,708,978, Cl. 524-5.000.

Roger, Marc: *See*—
Gain, Robert; Simon, Jacques; Pasturel, Andre ; and Roger, Marc, 4,708,836, Cl. 264-40.100.

Rohm GmbH: *See*—
Wenzel, Franz; Arndt, Peter J.; and Siol, Werner, 4,709,000, Cl. 526-320.000.

Rohr, Lorenz, to NCR Corporation. Extensible height-adjustable swivel arm for supporting a display or the like. 4,708,312, Cl. 248-280.100.

Rohrbein, Jurgen, to Gebruder Welger GmbH & Co. Kommanditgesellschaft. Device for stacking rectangular bales of stalky material. 4,708,565, Cl. 414-86.000.

Rohrer, George A.; and McMillan, Larry, to Ramtron Corporation. Monolithic semiconductor integrated circuit ferroelectric memory device, and methods of fabricating and utilizing same. 4,707,897, Cl. 29-25.420.

Rolf, Meinhard; Neeff, Rutger; and Muller, Walter, to Bayer Aktiengesellschaft. Anthraquinone-azo pyridone-containing compounds. 4,709,019, Cl. 534-655.000.

Roller, Durward W.: *See*—
Knapp, George P.; Higgins, Bobby W.; and Roller, Durward W., 4,709,337, Cl. 364-468.000.

Roman, Stephan. Bladed aircraft rotor with flexible blade mountings. 4,708,591, Cl. 416-102.000.

Romer, Rudolf: *See*—
Bisping, Bernhard; Gersbach, Klaus; and Romer, Rudolf, 4,708,064, Cl. 102-517.000.

Roose, Thomas R.: *See*—
Cathriner, Richard L.; and Roose, Thomas R., 4,708,793, Cl. 210-188.000.

Rosenbaum, Saul: *See*—
Gershen, Bernard; Rosenbaum, Saul; and Pearse, James N., 4,709,293, Cl. 361-50.000.

Rosamoore, Harold W., to Board of Governors of Wayne State University, The. Synergistic antimicrobial or biocidal mixtures. 4,708,808, Cl. 252-11.000.

Roth, Joseph A.; and Smith, Thomas A., to Eastman Kodak Company. Sodium ion selective electrode and method of use. 4,708,776, Cl. 204-1.00T.

Rottenmanner, Ernst: *See*—
Nagl, Michael; Fugger, Gerhard; Mraz, Jaroslav; Mailander, Horst; Rottenmanner, Ernst; Rauber, Norbert; and Luger, Wolfgang, 4,708,643, Cl. 432-95.000.

Roullet, Gerald: *See*—
Gouali, Mohamed; Roullet, Gerald; and Voisin, Oliver, 4,708,425, Cl. 350-96.160.

Roux, Michel: *See*—
Desprez, Marc; and Roux, Michel, 4,708,728, Cl. 65-136.000.

Roux, Yves M. J. P.; and Pitaud, Patrice G. L., to Moteurs Leroy-Somer. On board power supply particularly for a ship propelled by a variable speed diesel engine. 4,709,203, Cl. 322-87.000.

Rouzioux, Christine: *See*—
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435-5.000.

Rowe, Murray A., to CMI Corporation. Concrete finishing machine with adjustable auger unit. 4,708,520, Cl. 404-103.000.

Rozenbaum, Willy: *See*—
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435-5.000.

Rubner, Michael; and Sichel, Enid K., to GTE Laboratories Incorporated. Measurement of strain employing a piezoresistive blend of a doped acetylene polymer and an elastomer. 4,708,019, Cl. 73-760.000.

Rudick, Arthur G., to Coca-Cola Company, The. Concentrate dispensing system for a post-mix beverage dispenser. 4,708,266, Cl. 222-105.000.

Rudolf, Reiner: *See*—
Nestler, Wolfgang; and Rudolf, Reiner, 4,709,219, Cl. 335-129.000.

Ruesch, Merlin R., to Loctite Corporation. Dripless syringe. 4,708,270, Cl. 222-386.500.

Rukovena, Frank, Jr., to Norton Company. Liquid-gas absorption process. 4,708,856, Cl. 423-242.000.

Rundsztuk, Marek: *See*—
Baurand, Gilles; Fouret, Rene ; and Rundsztuk, Marek, 4,709,205, Cl. 324-127.000.

Rupprecht, Eckhard: *See*—
Brickl, Rolf; Schepky, Gottfried; Rupprecht, Eckhard; and Greischel, Andreas, 4,708,868, Cl. 924-80.000.

Rusanen, Hannu: *See*—
Rautakorpi, Paavo; Manttari, Risto; Liimatainen, Heikki; Pernu, Heikki; Tuomainen, Heikki; and Rusanen, Hannu, 4,708,011, Cl. 73-63.000.

Rusch, Reinhart: *See*—
Harre, Michael; Kruger, Hans-Rudolf; Arndt, Friedrich; and Rusch, Reinhart, 4,709,077, Cl. 560-056.000.

Ruschek, Gerhard: *See*—
Wietschorke, Stephan; Ruschek, Gerhard; and Sausner, Andreas, 4,708,110, Cl. 123-339.000.

Rushbrooke, Roger W.: *See*—
Beale, Nicholas C. L.; Rushbrooke, Roger W.; and Gladstone, Philip J. S., 4,709,365, Cl. 371-11.000.

Russell, Burdsall & Ward Corporation: *See*—
Pamer, W. Richard; and Zils, James A., 4,708,556, Cl. 411-179.000.

Russell, Carl D. Intermittent vehicular braking apparatus and method. 4,708,403, Cl. 303-61.000.

Rutsch, Werner: *See*—
Kirchmayr, Rudolf; and Rutsch, Werner, 4,708,926, Cl. 430-306.000.

Ruud Lighting, Inc.: *See*—
Heinisch, Richard V.; and Lewin, Ian, 4,709,312, Cl. 362-298.000.

Ryan, Timothy G., to Imperial Chemical Industries Plc. Polymer compositions containing magnetically susceptible filler. 4,708,976, Cl. 523-300.000.

Ryan, William P.: *See*—
Helmich, Melvin J.; Ryan, William P.; and Marvin, David H., 4,708,094, Cl. 123-27.0GE.

Ryason, P. R.: *See*—
Devries, Louis; and Ryason, P. R., 4,709,108, Cl. 585-415.000.

Ryobi Limited: *See*—
Emura, Masaharu; Uetsuki, Haruo; Aoki, Atsuhito; and Kobayashi, Takehiro, 4,708,303, Cl. 242-218.000.

Saarbergwerke AG: *See*—
Turner, Gerhard, 4,708,774, Cl. 202-239.000.

Sabatino, Daniel, to Flowtron Industries, Inc. Air eliminator for fluid handling systems. 4,708,157, Cl. 137-179.000.

Saeed, Abdul, to Black & Decker Inc. Method of assembling electric motors. 4,707,910, Cl. 29-596.000.

Sagami Chemical Research Center: *See*—
Shibasaki, Masakatsu; and Iimori, Takamasa, 4,709,064, Cl. 556-418.000.

Sagawa, Takatoshi: *See*—
Tateoka, Yasuo; Uemura, Ryuzo; and Sagawa, Takatoshi, 4,708,908, Cl. 428-423.100.

Sagefors, K. Ivar: *See*—
Bergman, Sten G. A.; Sagefors, K. Ivar; and Akesson, Bengt A., 4,708,522, Cl. 405-55.000.

Sagefors, Karl I.; and Persson, Per G., to Boliden Aktiebolag. Rock cavity. 4,708,523, Cl. 405-55.000.

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Koike, Mitsuhiro; Saijo, Yoshihiro; and Kume, Tadaaki, 4,708,707, Cl. 493-313.000.

Saito, Shigeki; Hosokawa, Takao; and Mae, Masataka, to Murata Manufacturing Co., Ltd. Manufacturing method for an electronic component. 4,708,885, Cl. 427-58.000.

Saito, Takashi: *See*—
Honda, Haruhisa; and Saito, Takashi, 4,709,273, Cl. 358-256.000.

Saito, Tatsuya, to Olympus Optical Co., Ltd. Cautery hemostatic unit. 4,708,136, Cl. 128-303.100.

Saitoh, Hiroyuki: *See*—
Takahashi, Haruhiko; Inui, Toshiharu; Saitoh, Hiroyuki; Ishikawa, Noriyoshi; Funato, Hitoshi; Ohmori, Takashi; Kurata, Masami; and Katou, Yasuo, 4,709,149, Cl. 250-317.100.

Saitoh, Kyoichiro: *See*—
Konishi, Masataka; Saitoh, Kyoichiro; Ohkuma, Hiroaki; and Kawaguchi, Hiroshi, 4,708,872, Cl. 424-115.000.

Sakai, Etsuo; Nishioka, Asaaki; Watanabe, Kiyosi; and Mino, Iwao, to Denki Kagaku Kogyo Kabushiki Kaisha. Mold assembly. 4,708,626, Cl. 425-398.000.

Sakai, Tokuji: *See*—
Hirose, Isao; Amemiya, Tamio; and Sakai, Tokuji, 4,709,088, Cl. 562-414.000.

Sakai, Yasuhito, to Fuji Jukogyo Kabushiki Kaisha. System for controlling the pressure of oil in a system for a continuously variable transmission. 4,708,694, Cl. 474-28.000.

Sakai, Yoshiaki: *See*—
Kitahara, Toshihiro; Sakai, Yoshiaki; Kobayashi, Kou; and Kikuchi, Satoru, 4,709,283, Cl. 360-99.000.

Sakaibara, Toru; Tsujioka, Shigeo; Kajiura, Toshinori; Aoshima, Toshihisa; and Tonomura, Motonobu, to Hitachi, Ltd. Shading apparatus for displaying three dimensional objects. 4,709,231, Cl. 340-729.000.

Sakakibara, Yoshio: *See*—
Okamura, Hisashi; Kawamoto, Hiroshi; and Sakakibara, Yoshio, 4,708,927, Cl. 430-564.000.

Sakamoto, Masahide; and Shida, Masami, to Hitachi, Ltd. Method and system for idle speed control. 4,708,108, Cl. 123-339.000.

Sakane, Toshihiko; and Ogasa, Michio, to Mitsubishi Denki Kabushiki Kaisha. Radiation suppression device. 4,709,220, Cl. 335-214.000.

Sakata, Hirotsugu: *See*—
Hayano, Makoto; Nagatomo, Shigemi; Sakata, Hirotsugu; Hatori, Mitsuo; and Hattori, Hitoshi, 4,708,607, Cl. 418-55.000.

Sakata, Isao; Nakajima, Susumu; Koshimuzi, Koichi; Samejima, Natsuki; Inohara, Kazumi; and Takata, Hiroyuki. Pheophorbide derivatives and alkaline salts thereof. 4,709,022, Cl. 540-145.000.

Sakata, Shinji: *See*—
Nakamura, Kaoru; Sakata, Shinji; Ochiai, Chiaki; Furuta, Yoichi; and Tsubouchi, Kaoru, 4,707,989, Cl. 60-589.000.

Sakata Shokai, Ltd.: *See*—
Sugiura, Masahiro; and Yoshida, Michiyuki, 4,707,930, Cl. 33-623.000.

Sakurai, Masashi: *See*—
Nakano, Tasuku; Kouno, Kazuo; Hibino, Kazunari; and Sakurai, Masashi, 4,708,365, Cl. 280-801.000.
Salatinjants, Aida. Method of treatment of the infectious and viral diseases by one time interference. 4,708,952, Cl. 514-158.000.
Salerni, John V.; and Donovan, Joseph F., to Baker Oil Tools, Inc. Apparatus for maintaining clean fluid in a chamber in a subterranean well tool. 4,708,200, Cl. 166-55.100.
Salgad International Ltd.: *See*—
Argon, Gideon, 4,708,051, Cl. 89-40.020.
Argon, Gideon, 4,708,052, Cl. 89-41.010.
Salzer, William E., to Motorola Inc. Circuit and method for adding green synchronization pulse to red and blue video signals. 4,709,258, Cl. 358-27.000.
Samejima, Natsuki: *See*—
Sakata, Isao; Nakajima, Susumu; Koshimuzi, Koichi; Samejima, Natsuki; Inohara, Kazumi; and Takata, Hiroyuki, 4,709,022, Cl. 540-145.000.
Samsonite Corporation: *See*—
Van Hoye, Willibald, 4,707,881, Cl. 16-44.000.
Samuels, George J., to Allied Corporation. Nickel/indium alloy for use in the manufacture of a hermetically sealed container for semiconductor and other electronic devices. 4,709,122, Cl. 174-52.0FP.
Sana, Toshikazu: *See*—
Taniguchi, Akira; Ojio, Kuniji; Yamamoto, Tatsuya; and Sana, Toshikazu, 4,708,761, Cl. 156-516.000.
Sanders Associates, Inc.: *See*—
Herrick, David L., 4,709,239, Cl. 343-700.0MS.
Sanders, Bernard, to Beiersdorf A.G. Opening facilitating closure tape and container. 4,709,399, Cl. 383-66.000.
Sandusky, Heidi A.: *See*—
McMahon, Paul J.; and Sandusky, Heidi A., 4,708,240, Cl. 206-45.180.
Sankyo Company Limited: *See*—
Tamaoki, Hidetsune, 4,709,014, Cl. 530-333.000.
Sano, Kenji: *See*—
Yokoya, Hiroaki; Sano, Kenji; and Sato, Hideo, 4,708,922, Cl. 430-73.000.
Sano, Masaki; and Osafune, Koji, to Kabushiki Kaisha Toshiba. Read/-write amplifier power control device for a disk apparatus. 4,709,279, Cl. 360-78.000.
Sanshin Kogyo Kabushiki Kaisha: *See*—
Kanno, Isao; and Yamamoto, Yasuo, 4,708,669, Cl. 440-1.000.
Matsumoto, Kuniyoshi, 4,708,674, Cl. 440-88.000.
Santel, Hans-Joachim: *See*—
Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hanssler, Gerd, 4,708,731, Cl. 71-90.000.
Santilli, Domenic: *See*—
Myers, Drewfus Y., Jr.; Alexandrovich, Peter S.; Pearce, Glenn T.; Santilli, Domenic; Sreekumar, Chandrasekha; Berwick, Martin A.; Upson, Donald A.; and Goebel, William K., 4,708,923, Cl. 430-112.000.
Sappok, Manfred, to Siempelkamp Giesserei GmbH & Co. Method of and apparatus for the introduction of radiocative metallic wastes into a melting furnace. 4,708,571, Cl. 414-412.000.
Sarfati, Alberto G., to SOBREVIN Societe de brevets industriels-Etablissement. Thread delivery device. 4,708,299, Cl. 242-47.010.
Sarngadharan, Mangalasseril G.: *See*—
Montagnier, Luc; Chermann, Jean-Claude; Barre-Sinoussi, Francoise; Brun-Vezinet, Francoise; Rouzioux, Christine; Rozenbaum, Willy; Dauguet, Charles; Gruest, Jacqueline; Nugeyre, Marie-Therese; Rey, Francoise; Axler-Blin, Claudine; Chamaret, Solange; Gallo, Robert C.; Popovic, Mikulas; and Sarngadharan, Mangalasseril G., 4,708,818, Cl. 435–5.000.
Sarin, Vinod K.: *See*—
Buljan, Sergei-Tomislav V.; Lingertat, Helmut; Baldoni, J. Gary, II; and Sarin, Vinod K., 4,708,037, Cl. 82-1.00C.
Sasaki, Masaomi, to Ricoh Company, Ltd. Stilbene derivatives, distyryl derivatives and electrophotographic photoconductor comprising at least one of the derivatives. 4,709,096, Cl. 564-374.000.
Sasaki, Mitsuru: *See*—
Tomioka, Hiroki; Ooishi, Tadashi; Takahashi, Junya; Sasaki, Mitsuru; and Hirata, Naonori, 4,709,052. Cl. 548-548.000.
Sasaki, Shinichi: *See*—
Kubota, Atsushi; Taniishi, Shinnosuke; Sasaki, Shinichi; Kimura, Akiyoshi; and Koike, Michiro, 4,708,455, Cl. 355-3.00R.
Sasaki, Yutaka; Kiyomiya, Yutaka; and Nakamura, Toshio, to Nitto Chemical Industry Co., Ltd. Process for improving activity of tellurium containing metal oxide catalysts. 4,709,070, Cl. 558-322.000.
Sasaki, Yutaka; Kiyomiya, Yutaka; and Nakamura, Toshio, to Nitto Chemical Industry Co., Ltd. Process for improving activity of tellurium containing metal oxide catalysts. 4,709,071, Cl. 558-322.000.
Sasayama, Takao; Oho, Shigeru; Kanke, Atsushi; Shibata, Takanori; and Endo, Akira, to Hitachi, Ltd. Solid-state optical interferometer. 4,708,480, Cl. 356-350.000.
Sashoh, Hidehiko: *See*—
Ninomiya, Ichiro; Kizu, Soujiro; and Sashoh, Hidehiko, 4,709,277, Cl. 360-14.300.
Sato, Hidejiro. Attaching device for bag. 4,707,889, Cl. 24-30.50R.
Sato, Hideo: *See*—
Yokoya, Hiroaki; Sano, Kenji; and Sato, Hideo, 4,708,922, Cl. 430-73.000.
Sato, Hiroshi; Hirose, Kenichi; Ishii, Norio; and Umada, Youichi, to Sumitomo Chemical Company. Production of epsilon-caprolactam. 4,709,024, Cl. 540-536.000.
Sato, Hiroshi; Ikimi, Kiyoshi; Tojima, Hideto; and Takahashi, Mikoto, to Sumitomo Chemical Company, Limited. Process for dimerizing lower α-olefins. 4,709,112, Cl. 585-513.000.
Sato, Kiyoshi: *See*—
Hirata, Tadashi; Matsukuma, Ikuo; Yoshiie, Shigeo; Sato, Kiyoshi; and Ohashi, Yoichi, 4,708,956, Cl. 514-210.000.
Sato, Takanori, to Shimizu Construction Co., Ltd. Earthquake insulating building structure. 4,707,956, Cl. 52-167.000.
Sato, Yasushi: *See*—
Nagai, Toshinari; Masui, Takatoshi; Sato, Yasushi; and Katsuno, Toshiyasu, 4,707,985, Cl. 60-274.000.
Satoh, Susumu; Suzuki, Hideo; Obara, Takashi; Nishida, Minoru; and Hashimoto, Osamu, to Kawasaki Steel Corporation. Method of making cold rolled dual-phase structure steel sheet having an excellent deep drawability. 4,708,748, Cl. 148-2.000.
Satoh, Yutaka: *See*—
Otsuki, Hajime; Ishii, Kenjiro; Satoh, Yutaka; and Fukumoto, Fumio, 4,708,464, Cl. 355-45.000.
Satomura, Hiroshi: *See*—
Hosono, Nagao; Nagase, Yukio; Takeuchi, Tatsuo; Egami, Hidemi; and Satomura, Hiroshi, 4,709,298, Cl. 361-213.000.
Satonaka, Shinobu; Takahashi, Masanobu; Wakikaido, Takahiro; and Yoshioka, Masahiro, to Mita Industrial Co., Ltd. Operation panel and a displaying method for a copying machine. 4,708,470, Cl. 355-77.000.
Satou, Yasushi: *See*—
Katsuno, Toshiyasu; Nagai, Toshinari; Masui, Takatoshi; and Satou, Yasushi, 4,707,984, Cl. 60-274.000.
Satran, Amir: *See*—
Elka, Shmuel; and Satran, Amir, 4,708,537, Cl. 407-46.000.
Satten, Michael I.: *See*—
Lehmann, Roger W.; and Satten, Michael I., 4,708,683, Cl. 446-75.000.
Sauer, Heinz, to Rasmussen GmbH. Hose coupling. 4,708,375, Cl. 285-258.000.
Sauerschell, Wolfgang: *See*—
Szablewski, Piotr; and Sauerschell, Wolfgang, 4,708,289, Cl. 239-125.000.
Sausner, Andreas: *See*—
Wietschorke, Stephan; Ruschek, Gerhard; and Sausner, Andreas, 4,708,110, Cl. 123-339.000.
Savall, Jose; Parmentier, Claude; and Amelot, Bernard, to Freyssinet International (STUP). Frustoconic anchoring jaws for cables and their methods of manufacture. 4,707,890, Cl. 24-122.600.
Savanick, George A.: *See*—
Krawza, Walter G.; Savanick, George A.; and Connors, Steven W., 4,708,214, Cl. 175-424.000.
Sawada, Tadashi; Ikegami, Tatsuji; and Iguchi, Masashi, to Rikagaku Kenkyusho; and Osaka Vacuum, Ltd. Thread groove type vacuum pump. 4,708,586, Cl. 415-72.000.
Sawayama, Ippei: *See*—
Kadokura, Susumu; Sawayama, Ippei; Kato, Tomoaki; and Okamoto, Tadashi, 4,709,221, Cl. 336-200.000.
Saxena, Vinit: *See*—
Andresen, Brian D.; and Saxena, Vinit, 4,708,782, Cl. 204-299.00R.
Sayles, David C., to United States of America, Army. Method of generating crosalinking sites on the surface of ammonium perchlorate in solid interceptor propellants. 4,708,754, Cl. 149-11.000.
Scallan, David J., to Dresser Industries, Inc. Safety relief valve. 4,708,164, Cl. 137-476.000.
Schade, Michael: *See*—
Miketic, Sinisa; Schade, Udo; and Schade, Michael, 4,708,125, Cl. 128-4.000.
Schade, Udo: *See*—
Miketic, Sinisa; Schade, Udo; and Schade, Michael, 4,708,125, Cl. 128-4.000.
Schadt, Martin: *See*—
Petrzilka, Martin; Schadt, Martin; and Villiger, Alois, 4,708,441, Cl. 350-346.000.
Petrzilka, Martin; and Schadt, Martin, 4,709,030, Cl. 544-242.000.
Schaefer, Henry A.; and Garner, Terry N., to General Electric Company. Portable radio battery pack with on-off switch. 4,709,201, Cl. 320-2.000.
Schaeffer, Norbert; Bettinger, Gunter; Goetz, Klaus; Pfefferkorn, Dietmar; Burkle, Ottmar; Schmidts, Kurt; Schneider, Pierre; Wagner, Werner; Wietholter, Dieter; Dietze, Herbert; and Andriessen, Wilhelmus, to BASF Aktiengesellschaft. Adjusting means in particular for guide elements, and magnetic tape cassette possessing such means. 4,709,288, Cl. 360-130.210.
Schafer, Kenneth L. Animal watering apparatus. 4,708,091, Cl. 119-73.000.
Schaich, Eugen: *See*—
Rauscher, Elli; Schaich, Eugen; Neumann, Ulrich; Wahlefeld, August; Gruber, Wolfgang; and Empl, Bernhard, 4,709,020, Cl. 536-17.800.
Schauer, Friedrich, to kabelmetal electro Gesellschaft mit beschrankter Haftung. Method of connecting two electric lines and connection point produced thereby. 4,707,914, Cl. 29-872.000.
Schentrup, Lawrence M. Helicopter toy. 4,708,682, Cl. 446-36.000.
Schepky, Gottfried: *See*—
Brickl, Rolf; Schepky, Gottfried; Rupprecht, Eckhard; and Greischel, Andreas, 4,708,868, Cl. 924-80.000.
Scherber, Werner; and Schroeder, Hans W., to Dornier System GmbH. Protection of IR sensitive equipment. 4,708,419, Cl. 350-1.100.
Scherer, Manfred, to Krauss-Maffei A.G. Pressure centrifuge. 4,708,711, Cl. 494-41.000.
Schering A.G.: *See*—
Erhardt, Paul W.; Hagedorn, Alfred A., III; Lumma, William C., Jr.; and Wohl, Ronald A., 4,709,043, Cl. 548-318.000.

Harre, Michael; Kruger, Hans-Rudolf; Arndt, Friedrich; and Rusch, Reinhart, 4,709,077, Cl. 560-056.000.
Hofmeister, Helmut; Annen, Klaus; Laurent, Henry; and Wiechert, Rudolf, 4,708,823, Cl. 260-397.400.
Loebel, Klaus D., 4,708,957, Cl. 514-264.000.
Skuballa, Werner; Raduchel, Bernd; Schwarz, Norbert; Vorbruggen, Helmut; Casals-Stenzel, Jorge; Schillinger, Ekkehard; and Town, Michael H., 4,708,963, Cl. 514-530.000.
Scheuter, Karl R.: *See*—
Fischer, Gerhard; and Scheuter, Karl R., 4,709,395, Cl. 382-54.000.
Schiehser, Guy A.: *See*—
Abou-Gharbia, Magid A.; and Schiehser, Guy A., 4,709,027, Cl. 544-6.000.
Schield, John A.: *See*—
Naiman, Michael I.; Schield, John A.; and Cunningham, Lawrence J., 4,708,993, Cl. 525-356.000.
Schiller, Claude, to U.S. Philips Corporation. Laue camera. 4,709,384, Cl. 378-76.000.
Schilling, Hartmut; Peller, Helmuth; and Becker, Hansjoerg, to Rheinmetall GmbH. Full caliber training projectile. 4,708,065, Cl. 102-529.000.
Schillinger, Ekkehard: *See*—
Skuballa, Werner; Raduchel, Bernd; Schwarz, Norbert; Vorbruggen, Helmut; Casals-Stenzel, Jorge; Schillinger, Ekkehard; and Town, Michael H., 4,708,963, Cl. 514-530.000.
Schindler, Abbott M.; and Fuchs, Otto, to Unisys Corp. Float lapping fixture. 4,707,948, Cl. 51-216.00R.
Schirmer, Ulrich; Karbach, Stefan; Pommer, Ernst-Heinrich; Ammermann, Eberhard; Steglich, Wolfgang; Schwalge, Barbara A. M.; and Anke, Timm, to BASF Aktiengesellschaft. Acrylates, and fungicides which contain these compounds. 4,709,078, Cl. 560-060.000.
Schleicher, Hans: *See*—
Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; Gasteier, Rolf; and Erlecke, Jens, 4,709,197, Cl. 318-480.000.
Schlepfer, Walter: *See*—
Binder, Rolf; and Schlepfer, Walter, 4,707,888, Cl. 19-80.00R.
Schlingmann, Merten; Hoppe, Hans-Ullrich; and Dursch, Walter, to Hoechst Aktiengesellschaft. Process for the preparation of 4-benzyl aspartate. 4,709,086, Cl. 560-171.000.
Schlipf, Michael: *See*—
Tischer, Kurt M.; Schlipf, Michael; Lesiak, P. Dieter; and Wengert, Rolf, 4,708,678, Cl. 445-24.000.
Schloss, Phillip C.: *See*—
Anthony, Bruce O., Jr.; Batalden, Glenn D.; Mitchell, Glen R.; Schloss, Phillip C.; and Wells, David K., 4,709,328, Cl. 364-200.000.
Schlough, James R., to AM International Incorporated. Stitching head. 4,708,277, Cl. 227-88.000.
Schluter, Helmut: *See*—
Busen, Dietmar; Schluter, Helmut; Weghmann, Arnold; Blumler, Norbert; and Tecl, Bohuslav, 4,708,756, Cl. 156-143.000.
Schmid, Karl J., to Navistar International Transportation Corp. Roller cam follower with positive lubrication. 4,708,102, Cl. 123-90.350.
Schmidgall, Hartzell H.; and Schmidgall, Jon A., to Hawkeye Concrete Products Co. Concrete pipe making machine. 4,708,621, Cl. 425-183.000.
Schmidgall, Jon A.: *See*—
Schmidgall, Hartzell H.; and Schmidgall, Jon A., 4,708,621, Cl. 425-183.000.
Schmidt, Gerhard; Neukam, Christian; and Schmidt, Heinrich, to Hein, Lehmann AG. Screening device. 4,708,795, Cl. 210-304.000.
Schmidt, Heinrich: *See*—
Schmidt, Gerhard; Neukam, Christian; and Schmidt, Heinrich, 4,708,795, Cl. 210-304.000.
Schmidt, Josef: *See*—
Posey, John L.; and Schmidt, Josef, 4,708,045, Cl. 83-604.000.
Schmidt, Oskar; and Kubica, Wladislaw, to Lim Kunststoff Technologie Gesellschaft m.b.H. Tire made of castable or sprayable elastomers. 4,708,187, Cl. 152-530.000.
Schmidt, Robert R.: *See*—
Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hanssler, Gerd, 4,708,731, Cl. 71-90.000.
Schmidt, Werner, to Dynamit Nobel AG. Stable aqueous impregnating solutions prepared from hydrolyzed alkyl trialkoxysilanes. 4,708,743, Cl. 106-12.000.
Schmidts, Kurt: *See*—
Schaeffer, Norbert; Bettinger, Gunter; Goetz, Klaus; Pfefferkorn, Dietmar; Burkle, Ottmar; Schmidts, Kurt; Schneider, Pierre; Wagner, Werner; Wietholter, Dieter; Dietze, Herbert; and Andriessen, Wilhelmus, 4,709,288, Cl. 360-130.210.
Schmitges, Claus J.: *See*—
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Schmitter, Andre : *See*—
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Schneider, Connie J.: *See*—
Dirlikov, Stoil K.; and Schneider, Connie J., 4,709,059, Cl. 549-453.000.
Schneider, Georg: *See*—
Braun, Hans; and Schneider, Georg, 4,708,021, Cl. 73-861.060.
Schneider, Ortwin; and Georgitsis, Nikolaos, to Erweka Apparatebau GmbH. Sample handling apparatus. 4,708,023, Cl. 73-863.310.
Schneider, Pierre: *See*—
Schaeffer, Norbert; Bettinger, Gunter; Goetz, Klaus; Pfefferkorn, Dietmar; Burkle, Ottmar; Schmidts, Kurt; Schneider, Pierre; Wagner, Werner; Wietholter, Dieter; Dietze, Herbert; and Andriessen, Wilhelmus, 4,709,288, Cl. 360-130.210.
Schoeffler, Paul W.: *See*—
Shoeffler, David M.; and Schoeffler, Paul W., 4,708,675, Cl. 441-65.000.
Schoen, Klaus-Peter, to Hoechst Aktiengesellschaft. Decoating device. 4,708,452, Cl. 354-317.000.
Schoettle, Klaus; Sold, Roland; Brinkmann, Uwe; and Wagner, Werner, to BASF Aktiengesellschaft. Tape cassette, in particular a magnetic tape cassette, and a support liner therefor. 4,709,290, Cl. 360-132.000.
Schofield, Roy A., to Shorrock Security Systems Limited. Intruder detector. 4,709,153, Cl. 250-353.000.
Scholer, Jurgen: *See*—
Loser, Norbert; Tilgner, Leopold; and Scholer, Jurgen, 4,708,499, Cl. 384-539.000.
Schomblond, Jacques, to Cartier Industrie. Injection molds for the manufacture of composite bodies. 4,708,614, Cl. 425-120.000.
Schon & Cei, GmbH: *See*—
Jung, Klaus, 4,708,042, Cl. 83-112.000.
Schonhausen, Horst. Process for the preparation and application in situ of blends of structural material. 4,708,745, Cl. 106-85.000.
Schonlau, Juergen: *See*—
Seibert, Wolfram; Ocvirk, Norbert; and Schonlau, Juergen, 4,708,404, Cl. 303-114.000.
Schoonen, Adelbert J. M.: *See*—
De Haan, Pieter; Lerk, Coenraad F.; and Schoonen, Adelbert J. M., 4,708,874, Cl. 424-470.000.
Schottle, Peter: *See*—
Burger, Kurt; Friedrich, Heinz; Molkner, Thomas; and Schottle, Peter, 4,708,769, Cl. 156-659.100.
Schrey, Frank: *See*—
Chandross, Edwin A.; Dean, Robert E.; Gallagher, Patrick K.; Levy, Roland A.; Schrey, Frank; and Smolinsky, Gerald, 4,708,884, Cl. 427-39.000.
Schroeder, Diane M., to General Motors Corporation. Electrical connector with position assurance and assist. 4,708,413, Cl. 439-358.000.
Schroeder, Hans W.: *See*—
Scherber, Werner; and Schroeder, Hans W., 4,708,419, Cl. 350-1.100.
Schroeppel, Edward A., to Cordis Leads Inc. Method for controlling pacing of a heart in response to changes in stroke volume. 4,708,143, Cl. 128-419.0PG.
Schrooder, Joris, to Inventio AG. Apparatus for the load dependent control of an elevator. 4,708,224, Cl. 187-122.000.
Schulman, Richard D.: *See*—
Hanas, Orest J.; Pennypacker, Frank C.; Radloff, Charles B.; and Schulman, Richard D., 4,709,266, Cl. 380-20.000.
Schult, Manfred: *See*—
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Schulte-Ladbeck, Bernd H.: *See*—
Irani, Andrew A.; Schulte-Ladbeck, Bernd H.; and Arani, Aspee A., 4,707,883, Cl. 16-110.00R.
Schulte, Thomas L. Method of chemically debriding uncerated necrotic tissue. 4,708,873, Cl. 424-195.100.
Schulz, Donald N.; and Kaladas, Jeffrey J., to Exxon Research and Engineering Company. Cyclopolymerizable sulfobetaine monomer. 4,708,998, Cl. 526-287.000.
Schumacher, Thomas W.: *See*—
Harris, Gerald A.; and Schumacher, Thomas W., 4,709,306, Cl. 362-68.000.
Schwaiger, Ernst: *See*—
Mitteregger, Erich; and Schwaiger, Ernst, 4,708,632, Cl. 425-556.000.
Schwalge, Barbara A. M.: *See*—
Schirmer, Ulrich; Karbach, Stefan; Pommer, Ernst-Heinrich; Ammermann, Eberhard; Steglich, Wolfgang; Schwalge, Barbara A. M.; and Anke, Timm, 4,709,078, Cl. 560-060.000.
Schwartz, Jerome E.: *See*—
Ferentchak, Rudolph; Kozischek, James F.; and Schwartz, Jerome E., 4,708,967, Cl. 521-56.000.
Schwarz, Alfred C.: *See*—
Bickes, Robert W., Jr.; and Schwarz, Alfred C., 4,708,060, Cl. 102-202.700.
Schwarz, Frederick M.; and Griffin, James G., to United Technologies Corporation. Turbine cooling air supply system. 4,708,588, Cl. 415-115.000.
Schwarz, Norbert: *See*—
Skuballa, Werner; Raduchel, Bernd; Schwarz, Norbert; Vorbruggen, Helmut; Casals-Stenzel, Jorge; Schillinger, Ekkehard; and Town, Michael H., 4,708,963, Cl. 514-530.000.
Scott & Fetzer Company, The: *See*—
Simo, Donald M., 4,708,318, Cl. 251-292.000.
Scott, James R.: *See*—
Donaldson, Michael J.; Pue-Gilchrist, James D.; and Scott, James R., 4,708,430, Cl. 350-96.200.
Scott, Marshall H.; and Polstra, John D., to John Fluke Mfg. Co., Inc. Computer assisted fault isolation in circuit board testing. 4,709,366, Cl. 371-20.000.
Scott, Peter B.; and Hohla, Kristian, to Summit Technology, Inc. Laser excitation system. 4,709,373, Cl. 372-86.000.
Scott, Ray V., Jr.; Baumann, William M.; and House, David W., to UOP Inc. Alkylated triamines and higher polyamines as curing agents in polyurethane manufacture. 4,709,003, Cl. 528-60.000.
Scott USA Limited Partnership: *See*—
McNeal, Joseph R., 4,707,863, Cl. 2-436.000.

Seaberg, Richard D.: *See*—
Farmer, Stanley E.; and Seaberg, Richard D., 4,708,575, Cl. 414-607.000.
Sealright Co., Inc.: *See*—
Brazil, Michael J., 4,708,283, Cl. 229-5.500.
Sears, Claude L.: *See*—
Hambleton, Larry G.; Sears, Claude L.; and Offutt, Elmer B., 4,708,153, Cl. 134-170.000.
Segall, Peter L. Floppy disk directory envelope form. 4,708,285, Cl. 229-68.00R.
Seibert, Wolfram; Ocvirk, Norbert; and Schonlau, Juergen, to Alfred Teves GmbH. Hydraulic brake system with hydraulic brake force boosting. 4,708,404, Cl. 303-114.000.
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Belart, Juan; Seibert, Wolfram; and Ocvirk, Norbert, 4,708,405, Cl. 303-114.000.
Seike, Shinji: *See*—
Hatamura, Kouichi; Hiraoka, Tetsuo; Hokazono, Kazuaki; and Seike, Shinji, 4,708,097, Cl. 123-52.00M.
Seiko Espon Kabushiki Kaisha: *See*—
Murakami, Kenjiro, 4,708,502, Cl. 400-175.000.
Seiko Instruments & Electronics Ltd.: *See*—
Ochiai, Hitoshi, 4,709,200, Cl. 320-1.000.
Seiko Seiki Kabushiki Kaisha: *See*—
Sugita, Terumitsu; Shinozuka, Hideo; and Murayama, Koji, 4,708,598, Cl. 417-295.000.
Seikosha Co., Ltd.: *See*—
Moritani, Nakanobu; Sugita, Mitsuyuki; Hoshino, Isamu; Yanagi, Hirofumi; Ikeno, Hitoshi; and Konno, Tetsuro, 4,709,218, Cl. 331-116.0FE.
Yamaki, Masahiko, 4,709,309, Cl. 362-199.000.
Seissl, Johann: *See*—
Pfeiler, Manfred; Seissl, Johann; and Block, Peter C., 4,709,385, Cl. 378-99.000.
Seita, Yukio: *See*—
Ichikawa, Toshiji; Takahara, Kazuaki; Shimoda, Kazuhiro; Seita, Yukio; and Emi, Makoto, 4,708,800, Cl. 210-500.230.
Seitz Enzinger Noll Maschinenbau Aktiengesellschaft: *See*—
Born, Gerhard; and Kaiser, Klaus, 4,708,234, Cl. 198-453.000.
Seitz, Karl, to Ciba-Geigy Corporation. Fibre-reactive dyes containing halopyrimidine radicals to which a vinylsulfonyl or the like group is attached by means of a bridge member. 4,709,018, Cl. 534-618.000.
Sekiya, Masaaki: *See*—
Fujiwara, Hiroshi; Matsumoto, Tadashi; and Sekiya, Masaaki, 4,709,009, Cl. 528-481.000.
Sekiya, Satoshi; Matsumoto, Ikuo; and Fujiki, Kuniharu, to Victor Company of Japan, Ltd. Magnetic recording medium comprising an undercoat layer made of specific type of resin composition. 4,708,906, Cl. 428-336.000.
Sendelweck, Gene K., to RCA Corporation. Synchronizing circuit with improved interlace arrangement. 4,709,267, Cl. 358-148.000.
Sepragen Corporation: *See*—
Andresen, Brian D.; and Saxena, Vinit, 4,708,782, Cl. 204-299.00R.
Sera, Michitoshi; Watanabe, Mitukazu; and Aoki, Kiyoshi, to Kabushiki Kaisha Toshiba. Plunger for a multi-plunger type resin mold device. 4,708,613, Cl. 425-117.000.
Servi, Rami; Eidelberg, Boaz; Granot, Daniel; Armoza, Ehud; and Sher, Ephraim, to State of Israel, Ministry of Defense, Rafael Armament Development Authority. Method and apparatus for separating, feeding and/or folding sheets. 4,708,333, Cl. 270-45.000.
Seymour, Herbert E.; and Robbins, Michael S., to Xantech Corporation. Remote control unit integrator console. 4,709,412, Cl. 455-603.000.
Sgourakes, George E., to Foxboro Company, The. Apparatus and method for calibrating span of pressure measuring instruments. 4,708,010, Cl. 73-4.00R.
Shaffer, Robert: *See*—
Spiegelman, Stanley R.; Miller, Phillip E.; and Shaffer, Robert, 4,708,324, Cl. 266-87.000.
Shaginian, Suren G.: *See*—
Mkhikian, Robert M.; Shaginian, Suren G.; Markarian, Temur G.; Khaidukov, Georgy K.; Velidzhanian, Sofia V.; Manukian, Artashes R.; Karapetian, Artur K.; Kazarian, Aram V.; and Airapetian, Robert R., 4,708,628, Cl. 425-406.000.
Shain, Albert L., to Du Pont de Nemours, E. I., and Company. Low smoke generating, high char forming, flame retardant thermoplastic multi-block copolyesters. 4,708,975, Cl. 523-216.000.
Sharp, Bruce R. Storage tanks with secondary containment means and non-visual leak detection means. 4,708,015, Cl. 73-49.200.
Sharp Kabushiki Kaisha: *See*—
Hashimoto, Sadakatsu; and Kamei, Fumio, 4,709,349, Cl. 364-900.000.
Ishii, Yutaka; Nakagawa, Kenichi; and Funada, Fumiaki, 4,708,439, Cl. 350-331.00R.
Kamuro, Setsufumi; and Okada, Mikiro, 4,709,168, Cl. 307-448.000.
Masuda, Shinichi, 4,709,387, Cl. 379-354.000.
Mizoguchi, Saburo, 4,708,826, Cl. 261-30.000.
Okazaki, Masanori, 4,709,405, Cl. 455-151.000.
Okuda, Masakiyo; and Ohnishi, Kazuyuki, 4,708,461, Cl. 355-14.00R.
Tsumura, Takeo; Iwai, Hiroji; and Kadoya, Atsushi, 4,708,505, Cl. 400-697.100.
Sharp, Steve M.; Holstrom, John R.; Gain, Lorand H., Jr.; and Ballun, John V., to Amsted Industries Incorporated. Post assembly for buried valve having an above ground actuator. 4,708,160, Cl. 137-368.000.
Shaw, H. J.: *See*—
Desurvire, Emmanuel; Digonnet, Michel J. F.; and Shaw, H. J., 4,708,421, Cl. 350-96.150.
Shaw, Mark D.; Heyman, J. Tad; and Bierce, Laurence M., to Bondico, Inc. Salvage drum. 4,708,258, Cl. 220-288.000.
Shelar, Gary R., to R. J. Reynolds Tobacco Company. Pipe with replaceable cartridge. 4,708,151, Cl. 131-359.000.
Shell Internationale Research Maatschappij, B.V.: *See*—
Roberts, David L., 4,708,177, Cl. 141-93.000.
Shell Oil Company: *See*—
Ayers, Ray R., 4,709,356, Cl. 367-19.000.
Wong, Pui K.; and Handlin, Dale L., Jr., 4,708,990, Cl. 525-250.000.
Wong, Pui K., 4,708,994, Cl. 525-392.000.
Shemyakin, Evgeny I.; Kamensky, Veniamin V.; Kostylev, Alexandr D.; Sudnishnikov, Boris V.; Tupitsyn, Sergei K.; Tupitsyn, Konstantin K.; Plavskikh, Vladimir D.; and Chepurnoi, Nikolai P., to Institut Gornogo Dela So An SSSR. Reversible air-operated percussive action machine for driving holes in the ground. 4,708,211, Cl. 175-19.000.
Shen, Zai-ming: *See*—
Hasegawa, Toshiharu; Shen, Zai-ming; Muro, Shoujiro; Masuyama, Shigeru; and Toyooka, Akihisa, 4,709,364, Cl. 370-85.000.
Shenker, Martin: *See*—
LaRussa, Joseph A.; and Shenker, Martin, 4,708,438, Cl. 350-174.000.
Shenoy, Thirthahalli A.; and Wilson, Keith B., to Air Products and Chemicals, Inc. Gas separation process with single distillation column. 4,707,994, Cl. 62-11.000.
Shepherd, Charles G.; and Travale, Samuel, to B. D. Wait Co. Limited. Seal assembly. 4,708,830, Cl. 261-70.000.
Shepherd, John D. Preassembled platform stairway. 4,707,957, Cl. 52-183.000.
Sher, Ephraim: *See*—
Servi, Rami; Eidelberg, Boaz; Granot, Daniel; Armoza, Ehud; and Sher, Ephraim, 4,708,333, Cl. 270-45.000.
Sherritt Gordon Mines Limited: *See*—
Meddings, Basil, 4,709,148, Cl. 250-292.000.
Shibasaki, Masakatsu; and Iimori, Takamasa, to Sagami Chemical Research Center. β-N-substituted aminothiol ester and process for preparing the same. 4,709,064, Cl. 556-418.000.
Shibata, Kiyoshi; and Shigemura, Yutaka, to Mita Industrial Co., Ltd. Method and apparatus for feeding and conveying copying papers in a copying machine. 4,708,456, Cl. 355-3.0SH.
Shibata, Takanori: *See*—
Sasayama, Takao; Oho, Shigeru; Kanke, Atsushi; Shibata, Takanori; and Endo, Akira, 4,708,480, Cl. 356-350.000.
Shibata, Tohru: *See*—
Inagaki, Hiroshi; Miyamoto, Takeaki; Ito, Hiraku; and Shibata, Tohru, 4,708,951, Cl. 514-57.000.
Shibata, Yutaka: *See*—
Ohsawa, Yoshitaka; Shibata, Yutaka; Niwa, Shin-ichiro; Nishimura, Akira; and Uemiya, Takafumi, 4,708,833, Cl. 264-1.500.
Shida, Masami: *See*—
Sakamoto, Masahide; and Shida, Masami, 4,708,108, Cl. 123-339.000.
Shigemura, Yutaka: *See*—
Shibata, Kiyoshi; and Shigemura, Yutaka, 4,708,456, Cl. 355-3.0SH.
Shigeura, Junichi: *See*—
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Shikoku Kakooki Co., Ltd.: *See*—
Koike, Mitsuhiro; Saijo, Yoshihiro; and Kume, Tadaaki, 4,708,707, Cl. 493-313.000.
Shimakura, Yoshiteru: *See*—
Shimizu, Toshihide; Kaneko, Ichiro; Watanabe, Mikio; and Shimakura, Yoshiteru, 4,708,890, Cl. 427-230.000.
Shimizu, Akihito: *See*—
Takada, Toshiyuki; Fukui, Noboru; and Shimizu, Akihito, 4,707,986, Cl. 60-310.000.
Shimizu Construction Co., Ltd.: *See*—
Sato, Takanori, 4,707,956, Cl. 52-167.000.
Shimizu, Isoo; Matsumura, Yasuo; and Inomata, Yoshihisa, to Nippon Petrochemicals Company, Limited. Method for refining 2-(aryl substituted) propionic acid or its salt. 4,709,089, Cl. 562-494.000.
Shimizu, Masahiro; Okamoto, Tatsuo; and Tsukamoto, Katsuhiro, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device and a method of manufacturing the same. 4,708,904, Cl. 428-209.000.
Shimizu, Shigehisa; and Otokozawa, Takao, to Fuji Photo Film Co., Ltd. Method and apparatus for inspecting web surface. 4,709,157, Cl. 250-572.000.
Shimizu, Toshihide; Kaneko, Ichiro; Watanabe, Mikio; and Shimakura, Yoshiteru, to Shin-Etsu Chemical Co., Ltd. Method for preventing polymer scale deposition on the reactor walls in the polymerization of ethylenically unsaturated monomers. 4,708,890, Cl. 427-230.000.
Shimizu, Toshimitsu, to NEC Corporation. Subscriber line monitoring circuit. 4,709,386, Cl. 379-24.000.
Shimkunas, Alexander R.; and LaBrie, James J., to Micronix Corporation. Process for manufacturing a mask for use in X-ray photolithography using a monolithic support and resulting structure. 4,708,919, Cl. 430-5.000.
Shimoda, Kazuhiro: *See*—
Ichikawa, Toshiji; Takahara, Kazuaki; Shimoda, Kazuhiro; Seita, Yukio; and Emi, Makoto, 4,708,800, Cl. 210-500.230.
Shimohigashi, Katsuhiro; Masuda, Hiroo; Ikuzaki, Kunihiko; and Kawamoto, Hiroshi, to Hitachi, Ltd. Semiconductor memory. 4,709,353, Cl. 365-205.000.
Shimohigashi, Katsuhiro: *See*—
Nakagome, Yoshinobu; Aoki, Masakazu; Horiguchi, Masashi; Shimohigashi, Katsuhiro; and Ikenaga, Shinichi, 4,709,350, Cl. 365-45.000.
Shimokawa, Wataru; and Fukumori, Katuaki, to Hoechst Gosei Kabu-

shiki Kaisha. Process for preparing aqueous gel and use thereof. 4,708,821, Cl. 512-12.000.
Shimp, David A., to Interez, Inc. Blend of tris (cyanatophenyl) alkane and bis(cyanatophenyl) alkane. 4,709,008, Cl. 528-422.000.
Shimura, Shoichi, to Canon Kabushiki Kaisha. Semi-conductor mounting members for sheet-feeding guide plates and rollers. 4,708,457, Cl. 355-3.0TR.
Shin-Etsu Chemical Co., Ltd.: *See*—
Shimizu, Toshihide; Kaneko, Ichiro; Watanabe, Mikio; and Shimakura, Yoshiteru, 4,708,890, Cl. 427-230.000.
Yoshioka, Hiroshi; Ono, Ichiro; and Uehara, Hitoshi, 4,709,065, Cl. 556-428.000.
Shinko Electric Co., Ltd.: *See*—
Nakagawa, Hiroshi, 4,709,174, Cl. 310-12.000.
Nakagawa, Hiroshi, 4,709,175, Cl. 310-12.000.
Shinmei, Katsumasa; and Niikura, Kazuo, to Hitachi, Ltd. Method of starting a variable-speed pump turbine or a variable speed pump. 4,708,594, Cl. 417-53.000.
Shinohara, Hirofumi: *See*—
Ichinose, Katsuki; and Shinohara, Hirofumi, 4,709,354, Cl. 365-226.000.
Shinoura, Osamu: *See*—
Ohtsuki, Akira; Konno, Ryozo; Kanno, Nobumori; Sugai, Makio; Mihoya, Takashi; Kubota, Yuichi; Nishimatsu, Masaharu; Isobe, Yukihiro; Tanaka, Kazushi; and Shinoura, Osamu, 4,708,909, Cl. 428-425.900.
Shinozaki, Fumihiko; and Yokoyama, Yutaka, to Nippon Chemi-Con Corporation. Electrolyte for electrolytic capacitor. 4,708,811, Cl. 252-62.200.
Shinozuka, Hideo: *See*—
Sugita, Terumitsu; Shinozuka, Hideo; and Murayama, Koji, 4,708,598, Cl. 417-295.000.
Shintani, Kenji: *See*—
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Shiokawa, Kozo: *See*—
Kurahashi, Yoshio; Shiokawa, Kozo; Goto, Toshio; Kagabu, Shinzo; Matsumoto, Noboru; and Moriya, Koichi, 4,708,953, Cl. 514-166.000.
Shiomi, Hitomi: *See*—
Hashizume, Masatora; Kudoh, Eiichi; Fujiwara, Setuzo; and Shiomi, Hitomi, 4,707,893, Cl. 24-446.000.
Shiozaki, Makoto; and Akahori, Ichiro, to Nippondenso Co., Ltd. Electronically controlled fuel injection based on minimum time control for diesel engines. 4,708,111, Cl. 123-357.000.
Shiozumi, Motoji: *See*—
Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Shiozumi, Motoji; Takahashi, Kunio; Torao, Akira; Moriya, Susumu; and Momose, Atsushi, 4,708,882, Cl. 427-1.000.
Shira, Jerry P.: *See*—
Miutel, Alexander; and Shira, Jerry P., 4,708,977, Cl. 523-402.000.
Shiraishi, Eiichi: *See*—
Ohata, Tomohisa; Terui, Sadao; and Shiraishi, Eiichi, 4,708,946, Cl. 502-304.000.
Shiraishi, Isao, to Kabushiki Kaisha Toshiba. Linear member feeding apparatus. 4,708,236, Cl. 198-468.200.
Shirogami, Tamotsu: *See*—
Ogawa, Takashi; Shirogami, Tamotsu; and Murata, Kenji, 4,708,916, Cl. 429-38.000.
Shoeffler, David M.; and Schoeffler, Paul W. Steerable surfing body board. 4,708,675, Cl. 441-65.000.
Shoji, Leigh A.: *See*—
Anderson, Andrew G.; and Shoji, Leigh A., 4,708,229, Cl. 192-87.170.
Shomer, Dan. Chess for play by two, three or four persons. 4,708,349, Cl. 273-261.000.
Shores, Marvin W., to General Dynamics, Pomona Division. Hinge seal. 4,709,121, Cl. 174-35.00R.
Shorrock Security Systems Limited: *See*—
Schofield, Roy A., 4,709,153, Cl. 250-353.000.
Shroot, Braham; and Maignan, Jean, to Centre International de Recherches Dermatologiques (C.I.R.D.). 4,5-trimethylene-4-isothiazoline-3-ones and their use as a bactericide and fungicide agent. 4,708,959, Cl. 514-373.000.
Shyu, Jia-Ming, to Industrial Technology Research Institute. Automatic treadmill. 4,708,337, Cl. 272-69.000.
Sibalis, Dan, to Drug Delivery Systems Inc. Transdermal drug applicator. 4,708,716, Cl. 604-20.000.
Sichel, Enid K.: *See*—
Rubner, Michael; and Sichel, Enid K., 4,708,019, Cl. 73-760.000.
Sieburth, Scott M., to FMC Corporation. Substituted phenyltrialkylsilane insecticides. 4,709,068, Cl. 556-447.000.
Siedel, Joachim; Staepels, Johnny; and Ziegenhorn, Joachim, to Boehringer Mannheim GmbH. Process and reagent for the complete and rapid removal of a turbidity in a biological fluid. 4,708,939, Cl. 436-13.000.
Siegal, Burton L.; and Leshuk, Daniel J., to Kiwi Coders Corporation. Hydraulic coupling comprising a sealed closure and connection fitting for a flexible container. 4,708,260, Cl. 220-465.000.
Siegers, Hans-Peter; and Macke, Wilfried, to Henkel Kommanditgesellschaft auf Aktien. Fibrous perfume carrier for artificial flowers and a process for its manufacture. 4,708,900, Cl. 428-74.000.
Siemens Aktiengesellschaft: *See*—
Adam, Bernd, 4,709,127, Cl. 200-146.00R.
Eggert, Horst; and Olsen, Willi, 4,709,291, Cl. 361-2.000.
Loeffler, Herbert; and Preiner, Peter, 4,708,428, Cl. 350-96.200.
Pfeiler, Manfred; Seisel, Johann; and Block, Peter C., 4,709,385, Cl. 378-99.000.
Walther, Albert, 4,709,297, Cl. 361-212.000.
Siemer, Dennis K. Taped parts counter. 4,709,379, Cl. 377-3.000.
Siempelkamp Giesserei GmbH & Co.: *See*—
Sappok, Manfred, 4,708,571, Cl. 414-412.000.
Sieverding, Werner; Mettenbrink, Herbert; Pohlmann, Gunter; and Hackmann, Ludger, to Bramlage Gesellschaft mit beschrankter Haftung. Dispenser for pasty compositions. 4,708,267, Cl. 222-211.000.
Sigler, Gerald F., to Hoechst Celanese Corporation. Biotinylating agents. 4,709,037, Cl. 546-271.000.
Signetics Corporation: *See*—
Bril, Thijs W., 4,708,767, Cl. 437-18.000.
Signode Paper Products Company: *See*—
Liebel, Henry L., 4,708,247, Cl. 206-501.000.
Sikkenga, Jan: *See*—
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Siliconix Incorporated: *See*—
Blanchard, Richard A., 4,707,909, Cl. 437-109.000.
Silverman, Eugene B.; Simmons, Richard K.; and Croston, Robert B., to Advanced Resource Development Corporation. Remote control mobile surveillance system. 4,709,265, Cl. 358-108.000.
Silvestri, Giuseppe; Gambino, Salvatore; and Filardo, Giuseppe, to Consiglio Nazionale Delle Ricerche. Process for the electrocarboxylation of carbonyl compounds, for producing α-hydroxycarboxylic acids. 4,708,780, Cl. 204-59.00R.
Silvestrini, Thomas A., to Pfizer-Hospital Products Group, Inc. Fixation device for a ligament or tendon prosthesis. 4,708,132, Cl. 128-92.0YF.
Simmonds Precision Products, Inc.: *See*—
Spillman, William B., Jr., 4,709,145, Cl. 250-227.000.
Simmons, Lacy. Poultry oil sac removal method and apparatus. 4,707,886, Cl. 17-45.000.
Simmons, Richard K.: *See*—
Silverman, Eugene B.; Simmons, Richard K.; and Croston, Robert B., 4,709,265, Cl. 358-108.000.
Simo, Donald M., to Scott & Fetzer Company, The. Post valve handle. 4,708,318, Cl. 251-292.000.
Simon, Georges: *See*—
Durant, Jacques; Simon, Georges; and Charton, Alain, 4,708,049, Cl. 89-11.000.
Simon, Jacques: *See*—
Gain, Robert; Simon, Jacques; Pasturel, Andre ; and Roger, Marc, 4,708,836, Cl. 264-40.100.
Simpkins, F. Richard: *See*—
Ziegler, Michael J.; and Simpkins, F. Richard, 4,708,730, Cl. 65-261.000.
Sims, Claude: *See*—
Martin, Robert J.; and Sims, Claude, 4,709,360, Cl. 367-157.000.
Singer, Victor, to Morton Thiokol, Inc. Method of making rocket motor extendible nozzle exit cone. 4,707,899, Cl. 29-157.00C.
Singh, Balwant: *See*—
Forgione, Peter S.; and Singh, Balwant, 4,708,984, Cl. 525-127.000.
Singh, Rajesh K.: *See*—
Fountoulakis, Stavros G.; Steinbicker, Richard N.; Hruskoci, Daniel E.; and Singh, Rajesh K., 4,708,779, Cl. 204-27.000.
Sinniger, Joseph O.: *See*—
Bessler, Roger F.; Arbeiter, James H.; and Sinniger, Joseph O., 4,709,394, Cl. 382-49.000.
Sinocchi, Michael. Packaging clip dispenser. 4,708,261, Cl. 221-289.000.
Sintermetallwerk Krebsoege GmgH: *See*—
Huppmann, Winfried, 4,708,912, Cl. 428-547.000.
Siol, Werner: *See*—
Wenzel, Franz; Arndt, Peter J.; and Siol, Werner, 4,709,000, Cl. 526-320.000.
Siskind, Eric J.: *See*—
Morrison, John; Siskind, Eric J.; and Frost, Meryll M., Jr., 4,709,332, Cl. 364-414.000.
Skach, Edward J., Jr.; Brake, David W.; and Waibel, Joseph H., to Dow Chemical Company, The. Injectable reagents for molten metals. 4,708,737, Cl. 75-58.000.
SKF Gleitlager GmbH: *See*—
Loser, Norbert; Tilgner, Leopold; and Scholer, Jurgen, 4,708,499, Cl. 384-539.000.
Skj veland, Odd: *See*—
Molaug, Ole; Havrevold, Sveinung B.; and Skj veland, Odd, 4,708,090, Cl. 119-51.00R.
Sklavounos, Constantine, to Pfizer Inc. Biotin intermediates. 4,709,044, Cl. 548-321.000.
Skuballa, Werner; Raduchel, Bernd; Schwarz, Norbert; Vorbruggen, Helmut; Casals-Stenzel, Jorge; Schillinger, Ekkehard; and Town, Michael H., to Schering Aktiengesellschaft. Novel carbacyclins, their preparation and use. 4,708,963, Cl. 514-530.000.
Skylite Industry Co., Ltd.: *See*—
Ohashi, Keiichi, 4,709,310, Cl. 362-205.000.
Slavik, Walter: *See*—
Graber, Werner; and Slavik, Walter, 4,707,976, Cl. 57-263.000.
Smith, Bernard: *See*—
Branovich, Louis E.; Freeman, Gerard L.; and Smith, Bernard, 4,708,681, Cl. 445-50.000.
Smith, Fred P.: *See*—
Smith, Fred T.; and Smith, Fred P., 4,708,570, Cl. 414-408.000.
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Smith, Gary R., to Smith RPM Corporation. Water pulse spray damp-

ening system and method for printing presses. 4,708,058, Cl. 101-147.000.
Smith, Gerald D.; and Werner, Ben E., to Agricultural Producers. Powered clipper for citrus fruits and the like. 4,707,918, Cl. 30-228.000.
Smith International, Inc.: *See*—
Kar, Nareshchandra J., 4,708,752, Cl. 148-127.000.
McPherson, James N., 4,708,496, Cl. 384-303.000.
Smith, Joe M., to Tri-State Enterprises. Corner mounted tray. 4,708,310, Cl. 248-220.100.
Smith, Marshall J.: *See*—
Lessard, Philip A.; and Smith, Marshall J., 4,708,165, Cl. 137-509.000.
Smith RPM Corporation: *See*—
Smith, Gary R., 4,708,058, Cl. 101-147.000.
Smith, Samuel C. Eccentrically weighted rolling device returns uphill. 4,708,686, Cl. 446-166.000.
Smith, Thomas A.: *See*—
Roth, Joseph A.; and Smith, Thomas A., 4,708,776, Cl. 204-1.00T.
Smolinsky, Gerald: *See*—
Chandross, Edwin A.; Dean, Robert E.; Gallagher, Patrick K.; Levy, Roland A.; Schrey, Frank; and Smolinsky, Gerald, 4,708,884, Cl. 427-39.000.
Smyth, Sean C.: *See*—
Harandi, Mohsen N.; Owen, Hartley; and Smyth, Sean C., 4,709,113, Cl. 585-640.000.
Snader, Kenneth M.: *See*—
Higa, Tatsuo; and Snader, Kenneth M., 4,708,962, Cl. 514-475.000.
Snider, Robert C. Portable stool. 4,708,308, Cl. 248-165.000.
Snyder, William E., to Procter & Gamble Company, The. Nonlathering cleansing mousse with skin conditioning benefits. 4,708,813, Cl. 252-90.000.
So, Vincent C.; Hughes, Richard P.; Vella, Paul J.; and Lamont, Jason B., to Northern Telecom Limited. Method of determining optical fiber splice loss. 4,708,476, Cl. 356-73.100.
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Brockmeyer, Jerry W.; Aubrey, Leonard S.; Dore, James E.; and Soble, Clifford N., 4,708,326, Cl. 266-159.000.
SOBREVIN Societe de brevets industriels-Etablissement: *See*—
Sarfati, Alberto G., 4,708,299, Cl. 242-47.010.
Sobstad Sailmakers, Inc.: *See*—
Conrad, Peter G., 4,708,080, Cl. 114-103.000.
Societe Amenagement Urbain et Rural S.A.: *See*—
Deguin, Alain, 4,708,794, Cl. 210-189.000.
Societe Anonyme de Telecommunications: *See*—
Guerillot, Yves M. N., 4,709,227, Cl. 340-347.0DD.
Societe Anonyme des Usines Chausson: *See*—
Clair, Patrice, 4,707,905, Cl. 29-446.000.
Societe Anonyme Elf France: *See*—
Grangette, Henri; Llinares, Michel; Bossand, Bernard; and Faure, Alain, 4,708,720, Cl. 44-51.000.
Societe Anonyme: Letra Systemes: *See*—
Etcheparre, Jean; and Etcheparre, Bernard, 4,708,331, Cl. 270-31.000.
Societe Chauvin Arnoux: *See*—
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Societe Nationale des Poudres et Explosifs: *See*—
Tkatchenko, Igor; Jaouhari, Rabih; Bonnet, Michel; Dawkins, Gordon; and Lecolier, Serge, 4,709,087, Cl. 560-339.000.
Societe Nationale d'Exploitation Industrielle des Tabacs et Allumettes: *See*—
Buisson, Claude; and Delafoy, Jean-Alain, 4,708,237, Cl. 198-726.000.
Societe Nationale Elf Aquitaine: *See*—
Vergne, Bernard, 4,708,634, Cl. 431-1.000.
Societe Nationale Industrielle et Aerospatiale: *See*—
Baron, Claude, 4,708,547, Cl. 409-233.000.
Soderbaum, Mavis, to Berkowitz, Gerard; and Stewart, Jeffrey, a part interest. Adaptor handle. 4,708,357, Cl. 280-289.00H.
Sold, Roland: *See*—
Schoettle, Klaus; Sold, Roland; Brinkmann, Uwe; and Wagner, Werner, 4,709,290, Cl. 360-132.000.
Someno, Tetsuya; Kato, Kazuo; Takahashi, Yasushi; Ishii, Shinichi; Takeuchi, Tomio; and Umezawa, Hamao, to Nippon Kayaku Kabushiki Kaisha. Protease adsorbent and process for purifying TPA utilizing the same. 4,708,944, Cl. 502-7.000.
Sonders, Mark: *See*—
Weber, Eckard; Sonders, Mark; and Keana, John F., 4,709,094, Cl. 564-238.000.
Sone, Takonori: *See*—
Hidaka, Hiroyoshi; and Sone, Takonori, 4,709,032, Cl. 544-363.000.
Sones, Richard A., to Picker International, Inc. Imaging with focused curved radiation detectors. 4,709,382, Cl. 378-62.000.
Sonnemaker, Frank F. Ice fishing apparatus. 4,707,932, Cl. 43-17.000.
Sony Corporation: *See*—
Fukuda, Tokuya, 4,709,275, Cl. 358-310.000.
Kuwabara, Shinichiro, 4,709,417, Cl. 455-611.000.
Nakamura, Akira; Oinoue, Hiroshi; Ishida, Tomoyuki; and Shintani, Kenji, 4,709,139, Cl. 250-201.000.
Ninomiya, Ichiro; Kizu, Soujiro; and Sashoh, Hidehiko, 4,709,277, Cl. 360-14.300.
Yoshinaka, Tadaaki, 4,709,276, Cl. 358-326.000.
Sotoya, Koshiro: *See*—
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Soudure et Mechanique Appliquees Du Val Notre-Dame: *See*—
Picard, Didier; and Roblin, Pierre, 4,708,251, Cl. 212-182.000.
Sowell, Lyles H., to Du Pont de Nemours, E. I., and Company. Crimper discharge regulation. 4,707,896, Cl. 28-250.000.
SpaceLabs, Inc.: *See*—
Lane, Philip S., 4,708,146, Cl. 128-723.000.
Spacesaver Corporation: *See*—
Peterman, Robert J., 4,708,411, Cl. 312-201.000.
Spanswick, James; and Kuhlmann, George E., to Standard Oil Company. Polyacyl aryl arylates. 4,709,080, Cl. 560-86.000.
Sparton Corporation: *See*—
Martin, Robert J.; and Sims, Claude, 4,709,360, Cl. 367-157.000.
Spath, Dieter: *See*—
Stolzer, Paul; and Spath, Dieter, 4,708,566, Cl. 414-276.000.
Specht, Malcolm R.: *See*—
Cowan, Carl E.; Lubinsky, Anthony R.; Nylund, Thomas W.; Specht, Malcolm R.; and Spence, John P., 4,708,459, Cl. 355-4.000.
Spector, George: *See*—
Ridley, William E.; and Spector, George, 4,709,176, Cl. 310-15.000.
Young, Elaine L.; and Spector, George, 4,708,892, Cl. 428-24.000.
Spectra-Physics, Inc.: *See*—
Hellekson, Ronald A.; and Peterson, Donald S., 4,709,195, Cl. 318-254.000.
Howard, Peter G., 4,709,369, Cl. 372-38.000.
Rando, Joseph F.; and Koop, Dale E., 4,709,372, Cl. 372-58.000.
Speil, Walter, to Motomak Motorenbau, Maschinen- und Werkzeugfabrik, Konstruktionen GmbH. Hydraulic valve clearance compensation device. 4,708,103, Cl. 123-90.460.
Spence, John P.: *See*—
Cowan, Carl E.; Lubinsky, Anthony R.; Nylund, Thomas W.; Specht, Malcolm R.; and Spence, John P., 4,708,459, Cl. 355-4.000.
Spencer, Gordon R., to Raytheon Company. Color image display system for producing and combining two similarly-oriented color component images and an inverted color component image. 4,709,261, Cl. 358-66.000.
Sperling, Karin; and Fischer, Martin, to BASF Aktiengesellschaft. Preparation of alkenylaromatics. 4,709,109, Cl. 585-438.000.
Sperry Corporation: *See*—
Zweifel, Terry L., 4,709,336, Cl. 364-433.000.
Spiegelman, Stanley R.; Miller, Phillip E.; and Shaffer, Robert, to Westinghouse Electric Corp. Apparatus for in situ annealing of a pressure vessel. 4,708,324, Cl. 266-87.000.
Spielvogel, Bernard F., to United States of America, Army. Method of making boron analogues. 4,709,083, Cl. 560-110.000.
Spiess, Joachim, to Natronag Gesellschaft fuer Verpackungssysteme mbH. Bag-filling machine. 4,708,216, Cl. 177-160.000.
Spieth, Robert H.; and DeLorenzo, Anthony N., to Hazeltine Corporation. Color monitor with improved color accuracy and current sensor. 4,709,262, Cl. 358-74.000.
Spietschka, Ernst; and Troster, Helmut, to Hoechst Aktiengesellschaft. Process for the preparation of perylene-3,4,9,10-tetracarboxylic acid monoanhydride monoimides. 4,709,029, Cl. 544-125.000.
Spillman, William B., Jr., to Simmonds Precision Products, Inc. Method and apparatus for compensating fiber optic lead and connector losses in a fiber optic sensor by using a dual wavelength optical source and matched polarizer. 4,709,145. Cl. 250-227.000.
Spivack, John D.; and Pastor, Stephen D., to Ciba-Geigy Corporation. Substituted-(hydroxyphenyl)-pyrrolidine-2,5-dione stabilizers. 4,709,050, Cl. 548-520.000.
Sprague Devices, Inc.: *See*—
Forsythe, Alan K.; and Frigon, Richard J., 4,708,053, Cl. 91-284.000.
Sprague Electric Company: *See*—
Higgs, Jacob K., 4,709,214, Cl. 330-6.000.
Spring, Donald G.: *See*—
Johnsen, John L.; Wood, William E.; Devletian, Jack H.; and Spring, Donald G., 4,708,282, Cl. 228-263.160.
Squaratti, Armand: *See*—
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Square Grip Limited: *See*—
Clapson, John D., 4,707,955, Cl. 52-98.000.
Sreekumar, Chandrasekha: *See*—
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Staalkat B.V.: *See*—
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Staepels, Johnny: *See*—
Siedel, Joachim; Staepels, Johnny; and Ziegenhorn, Joachim, 4,708,939, Cl. 436-13.000.
Stambaugh, Lanier: *See*—
Masterson, Ian F.; Feinstein, Jonathan J.; and Stambaugh, Lanier, 4,708,738, Cl. 75-59.100.
Stanbro, William D.: *See*—
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Tischer, Kurt M.; Schlipf, Michael; Lesiak, P. Dieter; and Wengert, Rolf, 4,708,678, Cl. 445-24.000.
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Standard Oil Company: *See*—

Spanswick, James; and Kuhlmann, George E., 4,709,080, Cl. 560-86.000.
Standley, Paul M., to Dayco Products, Inc. Apparatus for making an endless power transmission belt. 4,708,610, Cl. 425-28.00B.
Stang, Hans W.: *See*—
Froebel, Gerd; and Stang, Hans W., 4,708,751, Cl. 148-23.000.
Stangenberg, Hartmut: *See*—
Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; Gasteier, Rolf; and Erlecke, Jens, 4,709,197, Cl. 318-480.000.
Stanley, Frederick W., Jr.; Lamphere, Jack C.; and Chonde, Yohannes, to Dow Chemical Company, The. Suspending agent for the suspension polymerization of water-soluble monomers. 4,708,997, Cl. 526-207.000.
Starkie, Alan H.: *See*—
Robinton, Michael A.; and Starkie, Alan H., 4,709,375, Cl. 375-27.000.
State of Israel, Ministry of Defense, Rafael Armament Development Authority: *See*—
Servi, Rami; Eidelberg, Boaz; Granot, Daniel; Armoza, Ehud; and Sher, Ephraim, 4,708,333, Cl. 270-45.000.
State of Oregon, acting by and through the Oregon State Board of Higher Education, acting for and on behalf of the Oregon Health Sciences University and the University of Oregon: *See*—
Weber, Eckard; Sonders, Mark; and Keana, John F., 4,709,094, Cl. 564-238.000.
Stauffer Chemical Company: *See*—
Carter, Charles G., 4,708,732, Cl. 71-92.000.
Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,708,735, Cl. 71-118.000.
Ste LOOK: *See*—
Peyre, Henri, 4,708,360, Cl. 280-605.000.
Stebles, Malcolm R. D.: *See*—
Bews, Brian; Critchley, Peter; Durrant, James A.; Stebles, Malcolm R. D.; and Tipping, Leigh R. H., 4,708,863, Cl. 424-47.000.
Steele, James R., to Dynamic Air Inc. Seal in high pressure pneumatic booster valve. 4,708,535, Cl. 406-93.000.
Steglich, Wolfgang: *See*—
Schirmer, Ulrich; Karbach, Stefan; Pommer, Ernst-Heinrich; Ammermann, Eberhard; Steglich, Wolfgang; Schwalge, Barbara A. M.; and Anke, Timm, 4,709,078, Cl. 560-060.000.
Stein, Alexander, to Quantum Logic Corporation. Apparatus for remote measurement of temperatures. 4,708,493, Cl. 374-128.000.
Steinberg, Robert M.: *See*—
Helbling, Clements A., Jr.; and Steinberg, Robert M., 4,708,852, Cl. 422-220.000.
Steinbicker, Richard N.: *See*—
Fountoulakis, Stavros G.; Steinbicker, Richard N.; Hruskoci, Daniel E.; and Singh, Rajesh K., 4,708,779, Cl. 204-27.000.
Steinhoff, Kenneth. Snow plow attachment. 4,707,936, Cl. 37-264.000.
Stemmle, Denis J., to Xerox Corporation. Auto duplex reproduction machine. 4,708,462, Cl. 355-24.000.
Stemmle, Denis J., to Xerox Corporation. Auto duplex reproduction machine. 4,708,468, Cl. 355-72.000.
Stengel, Kevin M.: *See*—
AbuJudom, David N., II; Dougherty, Joseph P.; and Stengel, Kevin M., 4,708,600, Cl. 417-322.000.
Stenner, Gustave H. Gear motor housing. 4,708,027, Cl. 74-421.00A.
Stephen, John F.: *See*—
Nelson, Richard V.; and Stephen, John F., 4,709,063, Cl. 549-561.000.
Stevenson, Barry E., to Ministry of Agriculture & Fisheries. Apparatus and method for drying and separation of material. 4,707,931, Cl. 34-10.000.
Stewart, Claude M. Water treatment compositions and processes. 4,708,814, Cl. 252-181.000.
Stewart, David P. M.: *See*—
Elsworth, Adrian J.; Daniell, Michael G.; Zwaan, Paul; and Stewart, David P. M., 4,708,831, Cl. 261-130.000.
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Stiftelsen for Industriell og Teknisk Forskning ved Norges Tekniske Hogskle (SINTEF): *See*—
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Stihler, Axel: *See*—
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Stihler Medizintechnik GmbH: *See*—
Dietrich, Kurt; Stihler, Axel; and Theilacker, Wolfgang, 4,709,135, Cl. 219-303.000.
Stindt, Diana J.: *See*—
Pippin, David J.; and Stindt, Diana J., 4,708,647, Cl. 433-32.000.
Stinebaugh, Donald E. Compact pressure-boosted internal combustion engine. 4,708,107, Cl. 123-317.000.
Stirling Thermal Motors, Inc.: *See*—
Meijer, Roelf J., 4,707,990, Cl. 60-641.150.
Stoakes, Richard L. Structural assemblies such as curtain walling. 4,707,959, Cl. 52-235.000.
Stoia, Harry J. Door lock mounting system. 4,708,007, Cl. 70-451.000.
Stok, Filippus L.: *See*—
Geerts, Wilhelmus H. M.; Stok, Filippus L.; and Tienkamp, Engbert, 4,709,260, Cl. 358-51.000.
Stolzer, Paul; and Spath, Dieter, to Keuro Maschinenbau Gesellschaft mit beschrankter, Haftung & Co. Kommanditgesellschaft. Stack conveyor and handler in the form of a crane. 4,708,566, Cl. 414-276.000.
Stopinc Aktiengesellschaft: *See*—
Block, Franz-Rudolf; Theissen, Wolfgang; Basler, Urs; and Pesovic, Branislav, 4,708,191, Cl. 164-150.000.
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Storey, James S.: *See*—
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Stork Bepak B.V.: *See*—
Willerding, J., 4,708,269, Cl. 222-377.000.
Stransky, Le Roy V. Process of manufacturing an improved electrical connector and product thereof. 4,708,668, Cl. 439-825.000.
Strickland, Danny K.: *See*—
Voshall, Donald K.; and Strickland, Danny K., 4,709,396, Cl. 383-5.000.
Voshall, Donald K.; and Strickland, Danny K., 4,709,397, Cl. 383-5.000.
Strickler, Gary R.: *See*—
Jung, Chu W.; Garrou, Philip E.; and Strickler, Gary R., 4,709,115, Cl. 585-643.000.
Strnad, Steve. Wood burning stove. 4,708,123, Cl. 126-289.000.
Strohmeyer, Max: *See*—
Grenacher, Armin V.; Strohmeyer, Max; Hoffmann, Herwig; and Elliehausen, Heinrich, 4,709,105, Cl. 568-883.000.
Stroud, Stanley G., to NL Industries, Inc. System for determining the free point of pipe stuck in a borehole. 4,708,204, Cl. 166-255.000.
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Strzala, Helmut: *See*—
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Suarez-Gonzalez, Ernesto, to United Technologies Corporation. Reflection corrected radiosity optical pyrometer. 4,708,474, Cl. 356-45.000.
Suda, Seiji: *See*—
Kugo, Masaru; Ouchi, Hideyuki; Katogi, Kouzou; Igarashi, Osamu; Suda, Seiji; Tokuyama, Keiichi; and Yamamura, Hirohisa, 4,708,440, Cl. 350-339.00F.
Suda, Yasuo; Akashi, Akira; and Hiramatsu, Akira, to Canon Kabushiki Kaisha. Apparatus for detecting shake of image of object. 4,709,138, Cl. 250-201.000.
Sudnishnikov, Boris V.: *See*—
Shenyakin, Evgeny I.; Kamensky, Veniamin V.; Kostylev, Alexandr D.; Sudnishnikov, Boris V.; Tupitsyn, Sergei K.; Tupitsyn, Konstantin K.; Plavskikh, Vladimir D.; and Chepurnoi, Nikolai P., 4,708,211, Cl. 175-19.000.
Suematsu, Toshio: *See*—
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Sueyasu, Seisuke: *See*—
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Sugai, Makio: *See*—
Ohtsuki, Akira; Konno, Ryozo; Kanno, Nobumori; Sugai, Makio; Mihoya, Takashi; Kubota, Yuichi; Nishimatsu, Masaharu; Isobe, Yukihiro; Tanaka, Kazushi; and Shinoura, Osamu, 4,708,909, Cl. 428-425.900.
Sugaya, Yukio: *See*—
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Sugimoto, Shun-ichiro: *See*—
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Moritani, Nakanobu; Sugita, Mitsuyuki; Hoshino, Isamu; Yanagi, Hirofumi; Ikeno, Hitoshi; and Konno, Tetsuro, 4,709,218, Cl. 331-116.0FE.
Sugita, Terumitsu; Shinozuka, Hideo; and Murayama, Koji, to Seiko Seiki Kabushiki Kaisha; and Nihon Radiator Co., Ltd. Rotary type gas compressor. 4,708,598, Cl. 417-295.000.
Sugiura, Masahiro; and Yoshida, Michiyuki, to Sakata Shokai, Ltd. Apparatus for mounting a relief plate for letterpress printing. 4,707,930, Cl. 33-623.000.
Sugiyama, Kiyoaki, to Nippon Air Brake Co., Ltd. Automatic tension adjusting mechanism for winding and transmitting device for automatic door. 4,708,695, Cl. 474-101.000.
Suhadolnik, Robert J.; Wu, Joseph M.; Doetsch, Paul; and Henderson, Earl E., to Research Corporation. (2-5')-Oligo (3'-deoxyadenylate) and derivatives thereof. 4,708,935, Cl. 435-91.000.
Suhara, Katsuhiro: *See*—
Hayashi, Keizo; Hasegawa, Hitoshi; and Suhara, Katsuhiro, 4,708,633, Cl. 425-574.000.
Sukup, Richard A.; and Harris, Monty E., to Western Company of North America, The. Drillable well-fluid flow control tool. 4,708,202, Cl. 166-123.000.
Sullivan, Jack O., to General Electric Company. Expandable wedge assembly for releasably securing an insert in a cutting tool. 4,708,536, Cl. 407-41.000.
Sumida, Seizi; Ono, Kaichi; Yoshida, Kazuo; and Yamada, Tomozo, to Nippon Oil and Fats Co., Ltd. Method of preparing fine crystal particles of maleic anhydride. 4,709,057, Cl. 549-262.000.
Sumitomo Chemical Company: *See*—
Sato, Hiroshi; Hirose, Kenichi; Ishii, Norio; and Umada, Youichi, 4,709,024, Cl. 540-536.000.
Sumitomo Chemical Company, Limited: *See*—
Nagano, Eiki; Yoshida, Ryo; Matsumoto, Hiroshi; Hashimoto, Shunichi; and Kamoshita, Katsuzo, 4,709,049, Cl. 548-513.000.

Sato, Hiroshi; Ikimi, Kiyoshi; Tojima, Hideto; and Takahashi, Mikoto, 4,709,112, Cl. 585-513.000.
Tanimoto, Yoshio; and Iketani, Kohichi, 4,708,992, Cl. 525-313.000.
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Sumitomo Electric Industries, Ltd.: *See*—
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Kakii, Toshiaki; Matsuno, Koichiro; Suzuki, Shuzo; Ashiya, Fumihiro; and Ishihara, Koushi, 4,708,433, Cl. 350-96.220.
Ohsawa, Yoshitaka; Shibata, Yutaka; Niwa, Shin-ichiro; Nishimura, Akira; and Uemiya, Takafumi, 4,708,833, Cl. 264-1.500.
Suzuki, Tomihiro, 4,709,251, Cl. 357-22.000.
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Summerford, Roark H.: *See*—
Bentz, L. Earl; and Summerford, Roark H., 4,708,672, Cl. 440-51.000.
Summit Technology, Inc.: *See*—
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Sundermann, Erich; Laurien, Hanno; Vahlbrauk, Wolfgang; and Reye, Hans, to Perfluktiv-Consult AG. Process for the thermal and/or chemical treatment of grained, granular or lump material. 4,708,642, Cl. 432-95.000.
Sunds Defibrator Aktiebolag: *See*—
Bylehn, Bo V. S.; and Granqvist, Iage H., 4,708,829, Cl. 261-62.000.
Sundstrand Corporation: *See*—
Cordner, Michael A., 4,708,030, Cl. 74-686.000.
Surber, Werner, to CIBA-GEIGY Corporation. Process for the preparation of alkali metal alcoholates. 4,709,103, Cl. 568-851.000.
Sutherland, Robert L.; and Brown, William M., to Federal Paper Board Co., Inc. Lock arrangement. 4,708,284, Cl. 229-48.00R.
Sutton, Gordon W.: *See*—
Brazier, John F.; Young, Alan H.; Viney, John E.; and Sutton, Gordon W., 4,708,638, Cl. 431-116.000.
Suzuki, Akira, to Hitachi, Ltd. Rotary compressor apparatus. 4,708,599, Cl. 417-295.000.
Suzuki, Hideo: *See*—
Satoh, Susumu; Suzuki, Hideo; Obara, Takashi; Nishida, Minoru; and Hashimoto, Osamu, 4,708,748, Cl. 148-2.000.
Suzuki, Hidetoshi: *See*—
Nanjyo, Hirotoshi; and Suzuki, Hidetoshi, 4,708,112, Cl. 123-357.000.
Suzuki, Kazunori: *See*—
Nagahama, Masamitsu; and Suzuki, Kazunori, 4,708,508, Cl. 401-199.000.
Suzuki, Kenji, to Fuji Photo Film Co., Ltd. Color image sensor. 4,709,259, Cl. 358-48.000.
Suzuki, Koji: *See*—
Takahashi, Kazuyoshi; Suzuki, Koji; Nagahira, Joji; Yoshihara, Kunio; Matsui, Toshiro; and Ishikawa, Tadashi, 4,709,319, Cl. 363-49.000.
Suzuki, Norio, to NEC Corporation. Color signal demodulation apparatus. 4,709,257, Cl. 358-23.000.
Suzuki, Shingo: *See*—
Yata, Yukio; and Suzuki, Shingo, 4,708,435, Cl. 350-129.000.
Suzuki, Shinichi: *See*—
Nagai, Tatsuo; Suzuki, Shinichi; and Yamazaki, Hiroshi, 4,708,924, Cl. 430-138.000.
Suzuki, Shuzo: *See*—
Kakii, Toshiaki; Matsuno, Koichiro; Suzuki, Shuzo; Ashiya, Fumihiro; and Ishihara, Koushi, 4,708,433, Cl. 350-96.220.
Suzuki, Takatoshi: *See*—
Ogo, Kazutaka; Hayashi, Masahiro; Suzuki, Takatoshi; Hokao, Katsuiku; Asai, Akio; and Tsuruhashi, Takayuki, 4,709,198, Cl. 318-571.000.
Suzuki, Takeshi: *See*—
Yamatsu, Isao; Abe, Shinya; Inai, Yuichi; Suzuki, Takeshi; Kinoshita, Kensaku; Mishima, Mannen; Katoh, Yoshinori; Kobayashi, Seiichi; Murakami, Manabu; and Yamada, Kouzi, 4,709,079, Cl. 560-66.000.
Suzuki, Tomihiro, to Sumitomo Electric Industries, Ltd. Double Schottky-gate field effect transistor. 4,709,251, Cl. 357-22.000.
Svensson, Sven G.: *See*—
Bjork, Jan; and Svensson, Sven G., 4,708,062, Cl. 102-420.000.
Swann, Lynn J.: *See*—
Wedertz, Larry D.; and Swann, Lynn J., 4,708,304, Cl. 244-3.260.
Swarr, Thomas E.; and Trocciola, John C., to International Fuel Cells Corporation. Molten carbonate cathodes and method of fabricating. 4,708,917, Cl. 429-40.000.
Swedo, Raymond J.: *See*—
Zupancic, Joseph J.; Swedo, Raymond J.; and Petty-Weeks, Sandra, 4,708,981, Cl. 525-59.000.
Swilley, Wilson H., to Cincinnati Butchers' Supply Company, The. Head hold down for hide puller. 4,707,885, Cl. 17-21.000.
Swiss Aluminium Ltd.: *See*—
Brockmeyer, Jerry W.; Aubrey, Leonard S.; Dore, James E.; and Soble, Clifford N., 4,708,326, Cl. 266-159.000.
Syntron, Inc.: *See*—
Woods, Theodore E.; Cole, Jimmy R.; and Burcham, James T., 4,709,355, Cl. 367-16.000.
Szablewski, Piotr; and Sauerschell, Wolfgang, to VDO Adolf Schindling AG. Injection valve. 4,708,289, Cl. 239-125.000.
Szabo, Gabor: *See*—
Heja, Gergely; Korbonits, Dezso; Palosi, Endre; Kiss, Pal; Gonczi, Csaba; Szvoboda nee Kanzel, Ida; Marvanyos, Ede; Kun, Judit; Szomor nee Wundele, Maria; Szabo, Gabor; Kallay, Tamas; and Ledniczky, Laszlo, 4,709,081, Cl. 560-100.000.
Szomor nee Wundele, Maria: *See*—
Heja, Gergely; Korbonits, Dezso; Palosi, Endre; Kiss, Pal; Gonczi, Csaba; Szvoboda nee Kanzel, Ida; Marvanyos, Ede; Kun, Judit; Szomor nee Wundele, Maria; Szabo, Gabor; Kallay, Tamas; and Ledniczky, Laszlo, 4,709,081, Cl. 560-100.000.
Szvoboda nee Kanzel, Ida: *See*—
Heja, Gergely; Korbonits, Dezso; Palosi, Endre; Kiss, Pal; Gonczi, Csaba; Szvoboda nee Kanzel, Ida; Marvanyos, Ede; Kun, Judit; Szomor nee Wundele, Maria; Szabo, Gabor; Kallay, Tamas; and Ledniczky, Laszlo, 4,709,081, Cl. 560-100.000.
T. Parker Distributing Company, Inc.: *See*—
Hogenson, Tad C., 4,708,057, Cl. 101-129.000.
Tabata, Toshiyuki; Aikawa, Hiroshi; Fujiwara, Yoshinari; and Yoda, Norio, to Nissan Motor Co., Ltd.; and Kinugawa Rubber Ind. Co., Ltd. Fluid-filled power unit mount device. 4,708,329, Cl. 267-140.100.
Tabb, David L., to Du Pont de Nemours, E. I., and Company. Process for dynamically partially gelling fluoroelastomers. 4,708,988, Cl. 525-194.000.
Tacker, Willis A., Jr.; Bourland, Joe D.; Babbs, Charles F.; and Geddes, Leslie A., to Medtronic, Inc. Sequential-pulse, multiple pathway defibrillation method. 4,708,145, Cl. 128-419.00D.
Tackett, James E., to Marathon Oil Company. Brine tolerant polymer for oil recovery applications. 4,708,205, Cl. 166-273.000.
Taddei-Contreras, Fernando: *See*—
Cardenas-Franco, Luis; and Taddei-Contreras, Fernando, 4,708,727, Cl. 65-29.000.
Taga, Yutaka: *See*—
Harada, Yoshiharu; Taga, Yutaka; Fukumura, Kagenori; Hayakawa, Yoichi; and Kawai, Masao, 4,708,032, Cl. 74-866.000.
Taguchi, Yoshinori: *See*—
Murakami, Azuma; Katsurahira, Yuji; and Taguchi, Yoshinori, 4,709,209, Cl. 324-207.000.
Taiyo Yuden Co., Ltd.: *See*—
Kishi, Hiroshi; Oshio, Minoru; Murai, Shunji; Wada, Takeshi; and Fukui, Masami, 4,709,299, Cl. 361-321.000.
Tajima, Yusuke; and Pucel, Robert A., to Raytheon Company. Frequency conversion circuits. 4,709,410, Cl. 455-333.000.
Takada, Minoru; and Tsuchiya, Toshio, to Honda Giken Kogyo Kabushiki Kaisha. Suspension for off-road motor vehicles. 4,708,361, Cl. 280-663.000.
Takada, Toshiyuki; Fukui, Noboru; and Shimizu, Akihito, to Kawasaki Jukogyo Kabushiki Kaisha. Exhaust system for water craft engines. 4,707,986, Cl. 60-310.000.
Takada, Yukiharu: *See*—
Endo, Juro; Murakami, Shiro; Takada, Yukiharu; and Koike, Yoshiharu, 4,709,284, Cl. 360-103.000.
Takagi, Kozi; Nomura, Ken; Hattori, Yoshiyuki; and Kamiya, Masahiko, to Nippondenso Co., Ltd. Hydraulic braking system with malfunction alarm junction. 4,708,406, Cl. 303-115.000.
Takagi, Shinichi: *See*—
Takano, Hiroshi; Takagi, Shinichi; Wada, Kiyokazu; Konishi, Sadaichi; and Kanaoka, Tomizo, 4,708,699, Cl. 474-144.000.
Takagi, Toshiaki: *See*—
Yoshimoto, Masayuki; and Takagi, Toshiaki, 4,708,796, Cl. 210-321.800.
Takahara, Kazuaki: *See*—
Ichikawa, Toshiji; Takahara, Kazuaki; Shimoda, Kazuhiro; Seita, Yukio; and Emi, Makoto, 4,708,800, Cl. 210-500.230.
Takahashi, Haruhiko; Inui, Toshiharu; Saitoh, Hiroyuki; Ishikawa, Noriyoshi; Funato, Hitoshi; Ohmori, Takashi; Kurata, Masami; and Katou, Yasuo, to Fuji Xerox Co., Ltd. Copying machine. 4,709,149, Cl. 250-317.100.
Takahashi, Junya: *See*—
Tomioka, Hiroki; Ooishi, Tadashi; Takahashi, Junya; Sasaki, Mitsuru; and Hirata, Naonori, 4,709,052, Cl. 548-548.000.
Takahashi, Kazuyoshi; Suzuki, Koji; Nagahira, Joji; Yoshihara, Kunio; Matsui, Toshiro; and Ishikawa, Tadashi, to Canon Kabushiki Kaisha. Power supply device. 4,709,319, Cl. 363-49.000.
Takahashi, Kunio: *See*—
Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Shiozumi, Motoji; Takahashi, Kunio; Torao, Akira; Moriya, Susumu; and Momose, Atsushi, 4,708,882, Cl. 427-1.000.
Takahashi, Masanobu: *See*—
Satonaka, Shinobu; Takahashi, Masanobu; Wakikaido, Takahiro; and Yoshioka, Masahiro, 4,708,470, Cl. 355-77.000.
Takahashi, Mikoto: *See*—
Sato, Hiroshi; Ikimi, Kiyoshi; Tojima, Hideto; and Takahashi, Mikoto, 4,709,112, Cl. 585-513.000.
Takahashi, Yasuhiro; Arai, Kazutaka; Ohara, Yoshio; Matsumoto, Hiroo; and Tsuchiya, Syuuzi, to Nissan Chemical Industries, Ltd. 2-phenylpropionic acid esters, method for optical resolution thereof and optically active substance thereof. 4,709,082, Cl. 560-105.000.
Takahashi, Yasushi: *See*—
Someno, Tetsuya; Kato, Kazuo; Takahashi, Yasushi; Ishii, Shinichi; Takeuchi, Tomio; and Umezawa, Hamao, 4,708,944, Cl. 502-7.000.
Takaki, Shoji: *See*—
Ohaska, Yohnosuke; and Takaki, Shoji, 4,709,060, Cl. 549-511.000.
Takamori, Takesi: *See*—
Kawabe, Ryoichi; Iwasaki, Tetsuo; Kozuru, Hiroshi; Yoda, Masashi; Matsunaga, Masakazu; Takamori, Takesi; and Nakasima, Matao, 4,707,867, Cl. 4-313.000.
Takano, Hiroshi; Takagi, Shinichi; Wada, Kiyokazu; Konishi, Sadaichi; and Kanaoka, Tomizo, to Mitsuboshi Belting Ltd. Method and appa-

ratus for reducing sound emanation from a drive system. 4,708,699, Cl. 474-144.000.
Takano, Nobuyoshi: *See—*
Yoshida, Kasumi; Takano, Nobuyoshi; and Ono, Naoya, 4,708,940, Cl. 436-45.000.
Takao, Mitsunori, to Nippondenso Co., Ltd. Apparatus for controlling an idle speed of an internal combustion engine. 4,708,109, Cl. 123-339.000.
Takara Kogyo Co., Ltd.: *See—*
Takarabe, Takashi; and Ueda, Yoshihiko, 4,708,792, Cl. 210-150.000.
Takarabe, Takashi; and Ueda, Yoshihiko, to Takara Kogyo Co., Ltd.; Takarabe, Takashi; and Ueda, Yoshihiko. Filter medium. 4,708,792, Cl. 210-150.000.
Takasago Medical Industry Co., Ltd.: *See—*
Inoue, Noboru; and Miura, Yoshio, 4,708,141, Cl. 128-334.00R.
Takase, Hiroshi: *See—*
Fujii, Toru; Takase, Hiroshi; and Imaizumi, Masaki, 4,708,442, Cl. 350-422.000.
Takashi, Ito: *See—*
Kenji, Yabusaki; Hitoshi, Tozawa; Akira, Noda; and Takashi, Ito, 4,708,477, Cl. 356-222.000.
Takata, Hiroyuki: *See—*
Sakata, Isao; Nakajima, Susumu; Koshimuzi, Koichi; Samejima, Natsuki; Inohara, Kazumi; and Takata, Hiroyuki, 4,709,022, Cl. 540-145.000.
Takauchi, Mitsuyoshi, to Happy Industrial Corporation. Device for generating stitch forming data in a sewing machine. 4,708,074, Cl. 112-453.000.
Takeda, Yuji: *See—*
Harada, Osamu; Takeda, Yuji; Suematsu, Toshio; Anzai, Katsushi; and Funato, Kazuhiko, 4,708,113, Cl. 123-425.000.
Takemoto, Takeshi, to Ricoh Company, Ltd. Electromagnetic hammer printing device including a limited action spring force. 4,708,501, Cl. 400-157.200.
Takemoto Yushi Kabushiki Kaisha: *See—*
Namiki, Mitsuo; Osawa, Toshihiko; Fukuda, Yasuko; and Ozaki, Tatsuhiko, 4,708,820, Cl. 252-398.000.
Takenoahita, Hidemitsu: *See—*
Hattori, Hisashi; Takenoshita, Hidemitsu; and Hanada, Yoichiro, 4,708,068, Cl. 110-245.000.
Takeuchi, Akihiko, to Canon Kabushiki Kaisha. Image forming apparatus. 4,709,250, Cl. 346-160.000.
Takeuchi, Tatsuo: *See—*
Hosono, Nagao; Nagase, Yukio; Takeuchi, Tatsuo; Egami, Hidemi; and Satomura, Hiroshi, 4,709,298, Cl. 361-213.000.
Takeuchi, Tomio: *See—*
Someno, Tetsuya; Kato, Kazuo; Takahashi, Yasushi; Ishii, Shinichi; Takeuchi, Tomio; and Umezawa, Hamao, 4,708,944, Cl. 502-7.000.
Takoshima, Takehiro: *See—*
Kato, Masakazu; and Takoshima, Takehiro, 4,709,243, Cl. 346-76.0PH.
Taleyarkhan, Rusi P.: *See—*
Mildrum, Claude M.; and Taleyarkhan, Rusi P., 4,708,845, Cl. 376-435.000.
Tamada, Kazukiyo, to Fuji Photo Film Co., Ltd. Device for loading or unloading magnetic disc pack. 4,709,282, Cl. 360-97.000.
Tanaoki, Hidetsune, to Sankyo Company Limited. Preparation of peptides with C-terminal proline amide. 4,709,014, Cl. 530-333.000.
Tamura, Masafumi; Uchiyama, Arisa; Kondo, Takashi; and Kageyama, Satoshi, to Kabushiki Kaisha Toshiba. Picture processing apparatus. 4,709,264, Cl. 358-93.000.
Tamura, Yoshiharu; and Kimura, Katsuji, to NEC Corporation. Battery-powered radio communication apparatus capable of prolonging the communicable state thereof. 4,709,404, Cl. 455-126.000.
Tanaka, Atsuo: *See—*
Donomoto, Tadashi; Tatematsu, Yoshiaki; Tanaka, Atsuo; and Kubo, Masahiro, 4,708,847, Cl. 420-129.000.
Tanaka, Kazushi: *See—*
Ohtsuki, Akira; Konno, Ryozo; Kanno, Nobumori; Sugai, Makio; Mihoya, Takashi; Kubota, Yuichi; Nishimatsu, Masaharu; Isobe, Yukihiro; Tanaka, Kazushi; and Shinoura, Osamu, 4,708,909, Cl. 428-425.900.
Tanaka, Kenichi: *See—*
Imai, Isamu; Oshima, Kazuo; Tanaka, Kenichi; and Inada, Norio, 4,708,185, Cl. 152-451.000.
Tanaka, Tsuneo; Yoshitomi, Tetsuro; Hanada, Koji; Ohashi, Mashato; and Hikosaka, Michichika, to Toyo Ink Manufacturing Co., Ltd.; and Toppan Printing Co., Ltd. Heat-sensitive transfer sheet. 4,708,903, Cl. 428-195.000.
Taniguchi, Akira; Ojio, Kuniji; Yamamoto, Tatsuya; and Sana, Toshikazu, to Kawasaki Jukogyo Kabushiki Kaisha. Laminating apparatus for prepreg materials. 4,708,761, Cl. 156-516.000.
Taniishi, Shinnosuke: *See—*
Kubota, Atsushi; Taniishi, Shinnosuke; Sasaki, Shinichi; Kimura, Akiyoshi; and Koike, Michiro, 4,708,455, Cl. 355-3.00R.
Tanimoto, Yoshio; and Iketani, Kohichi, to Sumitomo Chemical Company, Limited. Rubber compositions. 4,708,992, Cl. 525-313.000.
Tanioka, Hiroshi, to Canon Kabushiki Kaisha. Image processing apparatus. 4,709,274, Cl. 358-283.000.
Target Therapeutics: *See—*
Daniels, John R., 4,708,718, Cl. 604-53.000.
Tatematsu, Yoshiaki: *See—*
Donomoto, Tadashi; Tatematsu, Yoshiaki; Tanaka, Atsuo; and Kubo, Masahiro, 4,708,847, Cl. 420-129.000.
Tateoka, Yasuo; Uemura, Ryuzo; and Sagawa, Takatoshi, to Nissan Motor Co., Ltd. Plastic parts with surface-hardening coating containing ultraviolet absorber. 4,708,908, Cl. 428-423.100.
Tatsuoka, Masahiko: *See—*
Nakamura, Toru; Konishi, Satoshi; Yamada, Seiji; Tatsuoka, Masahiko; and Kubo, Michihiro, 4,708,215, Cl. 177-25.000.
Tauranca Limited: *See—*
Brazier, John F.; Young, Alan H.; Viney, John E.; and Sutton, Gordon W., 4,708,638, Cl. 431-116.000.
Taylor, John W., Jr., to Westinghouse Electric Corp. Selectable doppler filter for radar systems. 4,709,236, Cl. 342-101.000.
Taylor, Peter; and Griffin, Roger B. Releasable coupling. 4,708,548, Cl. 409-234.000.
Taylor, Richard J.; Kellar, Paul R. N.; and Hinson, Neil R., to Quantel Limited. Video processing systems. 4,709,393, Cl. 382-41.000.
Taylor, William B.: *See—*
Bustos, Rafael T.; and Taylor, William B., 4,708,552, Cl. 411-60.000.
Teac Corporation: *See—*
Enami, Katsuya; Kawamura, Sinobu; Nagase, Fumio; and Aikawa, Shinichi, 4,709,285, Cl. 360-104.000.
Inoue, Kazuhiko; Kawasaki, Tsutomu; and Ihana, Toshio, 4,709,281, Cl. 360-97.000.
Kitahara, Toshihiro; Sakai, Yoshiaki; Kobayashi, Kou; and Kikuchi, Satoru, 4,709,283, Cl. 360-99.000.
Technical Oil Tools Corporation: *See—*
Brown, Gregory D., 4,708,018, Cl. 73-439.000.
Tecl, Bohuslav: *See—*
Busen, Dietmar; Schluter, Helmut; Weghmann, Arnold; Blumler, Norbert; and Tecl, Bohuslav, 4,708,756, Cl. 156-143.000.
Tecmachine, Societe Anonyme: *See—*
Deux, Alain; Merant, Jean-Camille; Gibert, Francois; and Berger, Antoine, 4,707,973, Cl. 56-328.00R.
Teichmann, Paul: *See—*
Leifeld, Ferdinand; and Teichmann, Paul, 4,707,887, Cl. 19-0.200.
Teijin Petrochemical Industries, Ltd.: *See—*
Hirose, Isao; Amemiya, Tamio; and Sakai, Tokuji, 4,709,088, Cl. 562-414.000.
Tektronix, Inc.: *See—*
Morland, Mark R.; Cole, Paul A.; Cousins, Ivan J.; and Zandonatti, Raymond A., 4,708,661, Cl. 439-77.000.
Telectronics N.V.: *See—*
Hamilton, John R.; and Whigham, Robert H., 4,708,144, Cl. 128-419.0PG.
Teledyne Industries, Inc.: *See—*
McEachern, J. Albert, Jr.; and Brogdon, J. William, 4,708,602, Cl. 417-407.000.
Telefonaktiebolaget LM Ericsson: *See—*
Akerberg, Dag E., 4,709,401, Cl. 455-51.000.
Akerberg, Dag E., 4,709,402, Cl. 455-51.000.
Temperature Adjusters, Inc.: *See—*
Childs, Henry T., 4,708,722, Cl. 55-89.000.
Tengler, Hermann; and Mettler, Paul, to Elpatronic AG. Saturation monitoring arrangement and method of control for a frequency-converter welding deivce. 4,709,132, Cl. 219-110.000.
ten Kate, Herman H. J.: *See—*
van de Klundert, Louis J. M.; ten Kate, Herman H. J.; Sikkenga, Jan; Groenenboom, Maarten; and Lisser, Jacques, 4,709,314, Cl. 363-14.000.
Terayama, Arataro: *See—*
Ohta, Harutaka; Miyamoto, Kazuchiyo; Terayama, Arataro; Maruhashi, Seiji; and Gohdo, Shigeru, 4,708,082, Cl. 114-230.000.
Terry, Joel R.: *See—*
Kearton, William B.; Kloes, Kenneth A.; and Terry, Joel R., 4,708,844, Cl. 376-247.000.
Terry, Sydney L. Locking fastener. 4,708,555, Cl. 411-149.000.
Terui, Sadao: *See—*
Ohata, Tomohisa; Terui, Sadao; and Shiraishi, Eiichi, 4,708,946, Cl. 502-304.000.
Terumo Kabushiki Kaisha: *See—*
Ichikawa, Toshiji; Takahara, Kazuaki; Shimoda, Kazuhiro; Seita, Yukio; and Emi, Makoto, 4,708,800, Cl. 210-500.230.
Yoshimoto, Masayuki; and Takagi, Toshiaki, 4,708,796, Cl. 210-321.800.
Texaco Inc.: *See—*
Helbling, Clements A., Jr.; and Steinberg, Robert M., 4,708,852, Cl. 422-220.000.
Vasconcellos, Stephen R.; Najjar, Mitri S.; and McKeon, Ronald J., 4,708,819, Cl. 252-373.000.
Texas Instruments: *See—*
Enomoto, Osaomi; and Komatsuzaki, Katsuo, 4,708,768, Cl. 437-228.000.
Texas Instruments Incorporated: *See—*
Hynecek, Jaroslav, 4,708,766, Cl. 156-643.000.
Tezuka, Kazunari: *See—*
Morimoto, Yoshihiko; and Tezuka, Kazunari, 4,708,031, Cl. 74-866.000.
Thames, Edward E.: *See—*
Jennings, Charles E.; and Thames, Edward E., 4,708,376, Cl. 285-315.000.
Theeten, Jean-Bernard: *See—*
Erman, Marko; Theeten, Jean-Bernard; and Vodjdani, Nakita, 4,708,423, Cl. 350-96.150.

Theilacker, Wolfgang: *See*—
Dietrich, Kurt; Stihler, Axel; and Theilacker, Wolfgang, 4,709,135, Cl. 219-303.000.

Theissen, Wolfgang: *See*—
Block, Franz-Rudolf; Theissen, Wolfgang; Basler, Urs; and Pesovic, Branislav, 4,708,191, Cl. 164-150.000.

Theodoras, James T., II: *See*—
Piatt, Michael J.; Theodoras, James T., II; and Ray, Randy, 4,709,244, Cl. 346-140.00R.

Thermalloy Incorporated: *See*—
Jordan, William D.; and Clemens, Donald L., 4,709,302, Cl. 361-388.000.

Thomas, William C. Mask system for making multiple photographic exposures. 4,708,449, Cl. 354-122.000.

Thompson, Gerald C.: *See*—
Mylrea, William J.; and Thompson, Gerald C., 4,708,564, Cl. 414-36.000.

Thompson, Mortimer S., to Tri-Tech Systems International Inc. Closure cap with a linerless seal and a method for forming such closure and seal. 4,708,255, Cl. 215-329.000.

Thomson-CSF. *See*—
Broussoux, Dominique; and Micheron, Francois, 4,708,989, Cl. 525-199.000.
Defretin, Bruno, 4,709,388, Cl. 379-413.000.
Lemaire, Frederic, 4,709,217, Cl. 330-258.000.
Van Cang, Luc P., 4,709,343, Cl. 364-724.000.

Threadgill, James A., to Master Chemical Corporation. Tap lubricating system. 4,708,539, Cl. 408-61.000.

Thubeaville, Heinz: *See*—
Tietze, Jurgen; Danguillier, Wilhelm; Thubeaville, Heinz; Pohl, Siegfried; and Muller, Friedrich, 4,708,196, Cl. 165-47.000.

Tibor, Gergely: *See*—
Egon, Janosdesk; Tibor, Gergely; and Janos, Szabo , 4,708,226, Cl. 188-251.00A.

Tiede, James. Hideaway vehicle step. 4,708,355, Cl. 280-166.000.

Tien, Albert F.: *See*—
Blank, Richard E.; Tien, Albert F.; and Amith, Avraham, 4,708,677, Cl. 445-3.000.

Tienkamp, Engbert: *See*—
Geerts, Wilhelmus H. M.; Stok, Filippus L.; and Tienkamp, Engbert, 4,709,260, Cl. 358-51.000.

Tietjens, Eduard W., to U.S. Philips Corporation. Shaving apparatus. 4,707,923, Cl. 30-346.510.

Tietze, Jurgen; Danguillier, Wilhelm; Thubeaville, Heinz; Pohl, Siegfried; and Muller, Friedrich. Shaft cooler for the dry quenching of coke. 4,708,196, Cl. 165-47.000.

Tilghman, Stephen E.: *See*—
Forehand, Gilbert H.; Lynch, Michael J.; Duncan, Richard L.; Tilghman, Stephen E.; and Penn, Jack C., 4,709,234, Cl. 340-856.000.

Tilgner, Leopold: *See*—
Loser, Norbert; Tilgner, Leopold; and Scholer, Jurgen, 4,708,499, Cl. 384-539.000.

Tilman, Paul A.: *See*—
Boeckmann, Hugo; Huff, Glenn E.; and Tilman, Paul A., 4,708,245, Cl. 206-330.000.

Timmons, Gloria A.: *See*—
Timmons, John W.; and Timmons, Gloria A., 4,703,446, Cl. 351-158.000.

Timmons, John W.; and Timmons, Gloria A., to Engineered Specialty Products. Eyeglass frame and nasal cannula assembly. 4,708,446, Cl. 351-158.000.

Tinnes, Bernhard, to Metacon AG. Process for removing deposits from the flow channel of a tundish during continuous casting. 4,708,193, Cl. 164-453.000.

Tipping, Leigh R. H.: *See*—
Bews, Brian; Critchley, Peter; Durrant, James A.; Stebles, Malcolm R. D.; and Tipping, Leigh R. H., 4,708,863, Cl. 424-47.000.

Tischer, Kurt M.; Schlipf, Michael; Lesiak, P. Dieter; and Wengert, Rolf, to Standard Elektrik Lorenz. Adjustment apparatus for video display device and method therefor. 4,708,678, Cl. 445-24 900.

Tischer, Kurt-Manfred, to Standard Elektrik Lorenz. Implosion protection for video reproducing device. 4,709,272, Cl. 358-247.000.

Titan Manufacturing Co. Pty. Ltd., The: *See*—
Hamilton, Richard J. W., 4,708,550, Cl. 411-3.000.

Tkatchenko, Igor; Jaouhari, Rabih; Bonnet, Michel; Dawkins, Gordon; and Lecolier, Serge, to Societe Nationale des Poudres et Explosifs. Process for the synthesis of isocyanates and of isocyanate derivatives. 4,709,087, Cl. 560-339.000.

Tobler, Karl: *See*—
Lodetti, Attilio; and Tobler, Karl, 4,709,130, Cl. 219-69.00W.

Toda, Masato; and Yabe, Hisao, to Olympus Optical Co., Ltd. Endoscopic apparatus with connecting means. 4,708,126, Cl. 128-6.000.

Todaro, George J.: *See*—
Iwata, Kenneth K.; Fryling, Charlotte M.; and Todaro, George J., 4,708,948, Cl. 514-2.000.

Todd, Harry V., to Toddco. Recreational vehicle discharge pipe coupler. 4,708,370, Cl. 285-12.000.

Toddco: *See*—
Todd, Harry V., 4,708,370, Cl. 285-12.000.

Toho Yogyo Kabushiki Kaisha: *See*—
Kawasaki, Katsuhiro, 4,707,950, Cl. 51-401.000.

Tojima, Hideto: *See*—
Sato, Hiroshi; Ikimi, Kiyoshi; Tojima, Hideto; and Takahashi, Mikoto, 4,709,112, Cl. 585-513.000.

Tokuyama, Keiichi: *See*—
Kugo, Masaru; Ouchi, Hideyuki; Katogi, Kouzou; Igarashi, Osamu; Suda, Seiji; Tokuyama, Keiichi; and Yamamura, Hirohisa, 4,708,440, Cl. 350-339.00F.

Tokyo Kogaku Kikai Kabushiki Kaisha: *See*—
Kenji, Yabusaki; Hitoshi, Tozawa; Akira, Noda; and Takashi, Ito, 4,708,477, Cl. 356-222.000.

Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Kanto, Masaharu; Akiyoshi, Eiichi; and Ohtake, Yasuhisa, 4,708,680, Cl. 445-47.000.

Tolner, Harm: *See*—
Hoeberechts, Arthur M. E.; Van Hal, Henricus A. M.; Tolner, Harm; and Van Gorkom, Gerardus G. P., 4,709,185, Cl. 313-346.00R.

Tomaselli, Joe W.: *See*—
Nunley, C. Lynn; and Tomaselli, Joe W., 4,707,961, Cl. 52-408.000.

Tomioka, Hiroki; Ooishi, Tadashi; Takahashi, Junya; Sasaki, Mitsuru; and Hirata, Naonori, to Sumitomo Chemical Company, Limited. Soil disease-controlling imides. 4,709,052, Cl. 548-548.000.

Tomita, Haruo; Okamoto, Yasuo; and Yonezawa, Kazuya, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Glycidyl compound. 4,709,062, Cl. 549-553.000.

Tomita, Shozo: *See*—
Yamaguchi, Keiki; and Tomita, Shozo, 4,709,271, Cl. 358-244.000.

Tommis, Norman: *See*—
Day, Roger A.; Tommis, Norman; and Baker, Andrew R., 4,708,104, Cl. 123-193.00P.

Tonomura, Motonobu: *See*—
Sakaibara, Toru; Tsujioka, Shigeo; Kajiura, Toshinori; Aoshima, Toshihisa; and Tonomura, Motonobu, 4,709,231, Cl. 340-729.000.

Toplay Limited: *See*—
Udagawa, Yoshio, 4,708,685, Cl. 446-139.000.

Toppan Moore Company, Ltd.: *See*—
Watanabe, Hiroshi, 4,709,136, Cl. 235-379.000.

Toppan Printing Co., Ltd.: *See*—
Tanaka, Tsuneo; Yoshitomi, Tetsuro; Hanada, Koji; Ohashi, Mashato; and Hikosaka, Michichika, 4,708,903, Cl. 428-195.000.

Torao, Akira: *See*—
Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Shiozumi, Motoji; Takahashi, Kunio; Torao, Akira; Moriya, Susumu; and Momose, Atsushi, 4,708,882, Cl. 427-1.000.

Toray Industries, Inc.: *See*—
Yoshii, Toshiya; and Okabe, Kazuo, 4,708,905, Cl. 428-216.000.

Toro Company, The: *See*—
Grundy, Michael J., 4,708,291, Cl. 239-242.000.

Totino, Rocco A.: *See*—
Chang, Ping W.; Gruetzmacher, Gordon D.; Meltz, Clifford N.; and Totino, Rocco A., 4,708,974, Cl. 523-130.000.

Tower, Stephen N.: *See*—
Veronesi, Luciano; Tower, Stephen N.; and Klassen, William E., 4,708,842, Cl. 376-203.000.

Towler, Dwight A.: *See*—
Adams, Steven P.; Towler, Dwight A.; and Glaser, Luis, 4,709,012, Cl. 530-328.000.

Town, Michael H.: *See*—
Skuballa, Werner; Raduchel, Bernd; Schwarz, Norbert; Vorbruggen, Helmut; Casals-Stenzel, Jorge; Schillinger, Ekkehard; and Town, Michael H., 4,708,963, Cl. 514-530.000.

Toyo Cloth Co., Ltd.: *See*—
Ito, Hajime; and Miwa, Junichi, 4,708,891, Cl. 427-245.000.

Toyo Ink Mfg. Co., Ltd.: *See*—
Ohtsuki, Akira; Konno, Ryozo; Kanno, Nobumori; Sugai, Makio; Mihoya, Takashi; Kubota, Yuichi; Nishimatsu, Masaharu; Isobe, Yukihiro; Tanaka, Kazushi; and Shinoura, Osamu, 4,708,909, Cl. 428-425.900.
Tanaka, Tsuneo; Yoshitomi, Tetsuro; Hanada, Koji; Ohashi, Mashato; and Hikosaka, Michichika, 4,708,903, Cl. 428-195.000.

Toyoda Gosei Co., Ltd.: *See*—
Hayashi, Keizo; Hasegawa, Hitoshi; and Suhara, Katsuhiro, 4,708,633, Cl. 425-574.000.
Mabuchi, Akira; and Jinushi, Shinji, 4,708,894, Cl. 428-31.000.

Toyoda Gosei Co., Ltd: *See*—
Midooka, Masanori; Kubo, Takashi; Fujikawa, Atsunobu; and Motoda, Masanori, 4,708,351, Cl. 277-184.000.

Toyooka, Akihisa: *See*—
Hasegawa, Toshiharu; Shen, Zai-ming; Muro, Shoujiro; Masuyama, Shigeru; and Toyooka, Akihisa, 4,709,364, Cl. 370-85.000.

Toyota Jidosha Kabushiki Kaisha: *See*—
Abe, Shizuo, 4,708,700, Cl. 474-205.000.
Donomoto, Tadashi; Tatematsu, Yoshiaki; Tanaka, Atsuo; and Kubo, Masahiro, 4,708,847, Cl. 420-129.000.
Harada, Osamu; Takeda, Yuji; Suematsu, Toshio; Anzai, Katsushi; and Funato, Kazuhiko, 4,708,113, Cl. 123-425.000.
Harada, Yoshiharu; Taga, Yutaka; Fukumura, Kagenori; Hayakawa, Yoichi; and Kawai, Masao, 4,708,032, Cl. 74-866.000.
Ikemoto, Kazuhito, 4,708,026, Cl. 74-359.000.
Katsuno, Toshiyasu; Nagai, Toshinari; Masui, Takatoshi; and Satou, Yasushi, 4,707,984, Cl. 60-274.000.
Midooka, Masanori; Kubo, Takashi; Fujikawa, Atsunobu; and Motoda, Masanori, 4,708,351, Cl. 277-184.000.
Miyake, Takashi, 4,708,119, Cl. 123-559.000.
Nagai, Toshinari; Masui, Takatoshi; Sato, Yasushi; and Katsuno, Toshiyasu, 4,707,985, Cl. 60-274.000.

Ogo, Kazutaka; Hayashi, Masahiro; Suzuki, Takatoshi; Hokao, Katsuiku; Asai, Akio; and Tsuruhashi, Takayuki, 4,709,198, Cl. 318-571.000.
Yoshitsugu, Noritada, 4,708,367, Cl. 280-804.000.

Trans-World Manufacturing Corporation: *See*—
Franklin, Robert P., 4,707,940, Cl. 40-605.000.

Trantham, Dana C., to RCA Corporation. Regulator protection circuit for video apparatus. 4,709,321, Cl. 363-56.000.

Travale, Samuel: *See*—
Shepherd, Charles G.; and Travale, Samuel, 4,708,830, Cl. 261-70.000.

Tremblay, Robert A.: *See*—
Labombarde, Raymond A.; and Tremblay, Robert A., 4,707,970, Cl. 53-529.000.

Trendel, Alois F., to Owens-Illinois Closure Inc. Closure handling apparatus. 4,708,235, Cl. 198-454.000.

Tri-State Exterprises: *See*—
Smith, Joe M., 4,708,310, Cl. 248-220.100.

Tri-Tech Systems International Inc.: *See*—
Thompson, Mortimer S., 4,708,255, Cl. 215-329.000.

Trocciola, John C.: *See*—
Swarr, Thomas E.; and Trocciola, John C., 4,708,917, Cl. 429-40.000.

Troster, Helmut: *See*—
Spietschka, Ernst; and Troster, Helmut, 4,709,029, Cl. 544-125.000.

Troutner, Vernon H.; and King, Martin J., to McNeilab, Inc. Light array assembly for photoactivation patient treatment system. 4,708,715, Cl. 604-6.000.

Trox, Uwe; and Kussel, Willy, to Gewerkschaft Elsenhutte Westfalia GmbH. Methods of controlling the operation of mineral mining installations. 4,708,394, Cl. 299-1.000.

Trutzschler GmbH & Co. KG: *See*—
Leifeld, Ferdinand; and Teichmann, Paul, 4,707,887, Cl. 19-0.200.

Tsai, Tsu-Tzu; and Arnold, Fred E., to United States of America, Air Force. Polybenzobisthiazole from aryloxy naphthalic diacid. 4,709,006, Cl. 528-208.000.

Tschoke, Helmut: *See*—
Guntert, Josef; Hafele, Walter; and Tschoke, Helmut, 4,708,114, Cl. 123-449.000.

Tsubakimoto Chain Co.: *See*—
Kimura, Kazuo; and Maruyama, Masao, 4,708,696, Cl. 474-103.000.

Tsubouchi, Kaoru: *See*—
Nakamura, Kaoru; Sakata, Shinji; Ochiai, Chiaki; Furuta, Yoichi; and Tsubouchi, Kaoru, 4,707,989, Cl. 60-589.000.

Tsuchida, Manabu: *See*—
Higuchi, Mitsuo; and Tsuchida, Manabu, 4,709,165, Cl. 307-350.000.

Tsuchiya, Kiyomitsu: *See*—
Ohta, Hiromi; Ogawa, Shinji; Kajikawa, Yosiharu; Fukumura, Keiichi; Tsuchiya, Kiyomitsu; Kittaka, Kiyoshi; and Narita, Katsushi, 4,707,999, Cl. 62-474.000.

Tsuchiya, Syuuzi: *See*—
Takahashi, Yasuhiro; Arai, Kazutaka; Ohara, Yoshio; Matsumoto, Hiroo; and Tsuchiya, Syuuzi, 4,709,082, Cl. 560-105.000.

Tsuchiya, Toshio: *See*—
Taksda, Minoru; and Tsuchiya, Toshio, 4,708,361, Cl. 280-663.000.

Tsuchiya, William S. Flexible line cutting apparatus. 4,707,919, Cl. 30-276.000.

Tsudakoma Kogyo Kabushiki Kaisha: *See*—
Yoshida, Toshio, 4,708,173, Cl. 139-370.200.

Tsui, Gary: *See*—
Heimbigner, Thomas; and Tsui, Gary, 4,708,540, Cl. 408-72.00B.

Tsuji, Sadahiko, to Canon Kabushiki Kaisha. Photographic objective. 4,708,444, Cl. 350-427.000.

Tsujioka, Shigeo: *See*—
Sakaibara, Toru; Tsujioka, Shigeo; Kajiura, Toshinori; Aoshima, Toshihisa; and Tonomura, Motonobu, 4,709,231, Cl. 340-729.000.

Tsukagoshi, Tsuyoshi, to Olympus Optical Co., Ltd. High-frequency incision device. 4,708,137, Cl. 128-303.150.

Tsukamoto, Katsuhiro: *See*—
Shimizu, Masahiro; Okamoto, Tatsuo; and Tsukamoto, Katsuhiro, 4,708,904, Cl. 428-209.000.

Tsumura, Takeo; Iwai, Hiroji; and Kadoya, Atsushi, to Sharp Kabushiki Kaisha. Typewriter misprint correction method. 4,708,505, Cl. 400-697.100.

Tsuno, Koichi, to Sumitomo Electric Industries, Ltd. Fiberscope with bending mechanism. 4,708,434, Cl. 350-96.260.

Tsuruhashi, Takayuki: *See*—
Ogo, Kazutaka; Hayashi, Masahiro; Suzuki, Takatoshi; Hokao, Katsuiku; Asai, Akio; and Tsuruhashi, Takayuki, 4,709,198, Cl. 318-571.000.

TTE Holding Corp.: *See*—
McAuley, James A.; and Eppler, Susan G., 4,708,212, Cl. 175-42.000.

Tu-Way Products Company: *See*—
Griffin, Dana K., 4,707,877, Cl. 15-261.000.

Tubb, Anthony B.: *See*—
Flavell, John; Nash, Michael A.; and Tubb, Anthony B., 4,708,334, Cl. 271-182.000.

Tube Fab of Afton Corporation: *See*—
Redman, Robert J., 4,708,039, Cl. 82-2.500.

Tufts, Timothy A.: *See*—
Goel, Anil B.; and Tufts, Timothy A., 4,708,971, Cl. 521-167.000.

Tungatt, Paul D.; Tyler, Derek E.; and Cheskis, Harvey P., to Olin Corporation. Technique for forming silicon carbide coated porous filters. 4,708,740, Cl. 75-76.000.

Tuomainen, Heikki: *See*—
Rautakorpi, Paavo; Manttari, Risto; Liimatainen, Heikki; Pernu, Heikki; Tuomainen, Heikki; and Rusanen, Hannu, 4,708,011, Cl. 73-63.000.

Tupitsyn, Konstantin K.: *See*—
Shemyakin, Evgeny I.; Kamensky, Veniamin V.; Kostylev, Alexandr D.; Sudnishnikov, Boris V.; Tupitsyn, Sergei K.; Tupitsyn, Konstantin K.; Plavskikh, Vladimir D.; and Chepurnoi, Nikolai P., 4,708,211, Cl. 175-19.000.

Tupitsyn, Sergei K.: *See*—
Shemyakin, Evgeny I.; Kamensky, Veniamin V.; Kostylev, Alexandr D.; Sudnishnikov, Boris V.; Tupitsyn, Sergei K.; Tupitsyn, Konstantin K.; Plavskikh, Vladimir D.; and Chepurnoi, Nikolai P., 4,708,211, Cl. 175-19.000.

Turco, Deborah A.: *See*—
Turco, Josephine M.; and Turco, Deborah A., 4,708,866, Cl. 424-61.000.

Turco, Josephine M.; and Turco, Deborah A. Artificial nail composition. 4,708,866, Cl. 424-61.000.

Turner, Gerhard, to Saarbergwerke AG. Coal compactor rod retainer. 4,708,774, Cl. 202-239.000.

Turner, Janet N. Method and composition for artificially tanning the human epidermis. 4,708,865, Cl. 424-59.000.

Twogood, Rodney L.; Wright, Raymond L.; and Rawle, Roger D., to Burlington Northern Railroad Co. Cylinder liner sleeve puller. 4,707,900, Cl. 29-244.000.

Tyler, Derek E.: *See*—
Tungatt, Paul D.; Tyler, Derek E.; and Cheskis, Harvey P., 4,708,740, Cl. 75-76.000.

UBE Industries, Ltd.: *See*—
Akegi, Seiji, 4,708,016, Cl. 73-149.000.

Uchikata, Yoshio; Nozaki, Mineo; Nagashima, Masasumi; and Asakura, Osamu, to Canon Kabushiki Kaisha. Printer. 4,709,242, Cl. 346-76.0PH.

Uchiyama, Arisa: *See*—
Tamura, Masafumi; Uchiyama, Arisa; Kondo, Takashi; and Kageyama, Satoshi, 4,709,264, Cl. 358-93.000.

Udagawa, Yoshio, to Blue Box Toy Factory Limited; and Toplay Limited. Toys. 4,708,685, Cl. 446-139.000.

Uebel, Philipp: *See*—
Richter, Hanno; Mirsberger, Helmut; Uhlig, Raimer; Haage, Manfred; and Uebel, Philipp, 4,708,551, Cl. 411-32.000.

Ueda, Masahide; and Ohira, Tadashi, to Minolta Camera Kabushiki Kaisha. Electrostatic latent image developing apparatus. 4,708,458, Cl. 355-3.0DD.

Ueda, Yoshihiko: *See*—
Takarabe, Takashi; and Ueda, Yoshihiko, 4,708,792, Cl. 210-150.000.

Uehara, Hitoshi: *See*—
Yoshioka, Hiroshi; Ono, Ichiro; and Uehara, Hitoshi, 4,709,065, Cl. 556-428.000.

Uemiya, Takafumi: *See*—
Ohsawa, Yoshitaka; Shibata, Yutaka; Niwa, Shin-ichiro; Nishimura, Akira; and Uemiya, Takafumi, 4,708,833, Cl. 264-1.500.

Uemura, Ryuzo: *See*—
Tateoka, Yasuo; Uemura, Ryuzo; and Sagawa, Takatoshi, 4,708,908, Cl. 428-423.100.

Uetsuki, Haruo: *See*—
Emura, Masaharu; Uetsuki, Haruo; Aoki, Atsuhito; and Kobayashi, Takehiro, 4,708,303, Cl. 242-218.000.

Uhlig, Raimer: *See*—
Richter, Hanno; Mirsberger, Helmut; Uhlig, Raimer; Haage, Manfred; and Uebel, Philipp, 4,708,551, Cl. 411-32.000.

Ulbrich, Dieter: *See*—
Faulstich, Ingo; and Ulbrich, Dieter, 4,708,544, Cl. 409-12.000.

Umada, Youichi: *See*—
Sato, Hiroshi; Hirose, Kenichi; Ishii, Norio; and Umada, Youichi, 4,709,024, Cl. 540-536.000.

Umezawa, Hamao: *See*—
Someno, Tetsuya; Kato, Kazuo; Takahashi, Yasushi; Ishii, Shinichi; Takeuchi, Tomio; and Umezawa, Hamao, 4,708,944, Cl. 502-7.000.

Umezawa, Yujiro, to Bridgestone Corporation. Steel cords for the reinforcement of rubber articles. 4,707,975, Cl. 57-212.000.

Unger, K'aus: *See*—
Wenske, Hanno; Gallien, Arnold; Kauschinger, Martin; Unger, Klaus; Brendel, Josef; and Lampe, Lutz, 4,709,182, Cl. 310-316.000.

Uniden Corporation: *See*—
Baba, Yoshihiko, 4,709,407, Cl. 455-226.000.

Unigene Laboratories, Inc.: *See*—
Gilligan, James P.; and Jones, Barry N., 4,708,934, Cl. 435-68.000.

Union Camp Corporation: *See*—
Pavlin, Mark S.; and Veazey, Richard L., 4,709,084, Cl. 560-118.000.

Union Carbide Corporation: *See*—
Chu, Nan S.; and Kanner, Bernard, 4,709,067, Cl. 556-440.000.
Gray, Robert L., Jr., 4,709,117, Cl. 585-738.000.
Hatfield, James C., 4,708,812, Cl. 252-70.000.
Masterson, Ian F.; Feinstein, Jonathan J.; and Stambaugh, Lanier, 4,708,738, Cl. 75-59.100.
Zarchy, Andrew S.; Volles, Warren K.; and O'Keefe, Luke F., 4,709,116, Cl. 585-738.000.

Union Oil Company of California: *See*—
Kalfayan, Leonard J.; Watkins, David R.; and Hewgill, Gregory S., 4,708,207, Cl. 166-295.000.

Occelli, Mario L., 4,708,786, Cl. 208-120.000.
Unisys Corp.: *See*—
Schindler, Abbott M.; and Fuchs, Otto, 4,707,948, Cl. 51-216.00R.
United Kingdom Atomic Energy Authority: *See*—
Wilson, Eric G., 4,708,742, Cl. 75-252.000.
United States of America
Administrator, National Aeronautics and Space Administration: *See*—
Jhabvala, Murzban D.; Dargo, David R.; and Lyons, John C., 4,709,252, Cl. 357-30.000.
Administrator, National Aeronautics & Space Administration: *See*—
Bement, Laurence J.; and Bailey, James W., 4,708,280, Cl. 228-107.000.
Air Force: *See*—
Tsai, Tsu-Tzu; and Arnold, Fred E., 4,709,006, Cl. 528-208.000.
Army: *See*—
Branovich, Louis E.; Freeman, Gerard L.; and Smith, Bernard, 4,708,681, Cl. 445-50.000.
Fukuda, Robert C.; and Chandra, Suresh, 4,709,368, Cl. 372-10.000.
Koblin, Abraham, 4,708,869, Cl. 424-81.000.
Sayles, David C., 4,708,754, Cl. 149-11.000.
Spielvogel, Bernard F., 4,709,083, Cl. 560-110.000.
Energy: *See*—
Bickes, Robert W., Jr.; and Schwarz, Alfred C., 4,708,060, Cl. 102-202.700.
Health and Human Services: *See*—
Iwata, Kenneth K.; Fryling, Charlotte M.; and Todaro, George J., 4,708,948, Cl. 514-2.000.
Interior: *See*—
Krawza, Walter G.; Savanick, George A.; and Connors, Steven W., 4,708,214, Cl. 175-424.000.
National Aeronautics and Space Administration: *See*—
Ehl, James H., 4,708,330, Cl. 269-43.000.
Kelley, Henry L.; and Wilson, John C., 4,708,305, Cl. 244-17.190.
Navy: *See*—
Giuliani, John F., 4,708,941, Cl. 436-141.000.
Opfer, Gerald D., 4,708,278, Cl. 228-20.000.
U.S. Philips Corporation: *See*—
Almering, Petrus C. M.; and Zwaga, Bocke, 4,709,158, Cl. 307-200.00A.
Andrews, Arthur S.; and Widmer, David S., 4,708,478, Cl. 356-244.000.
Bakker, Eppe; and Hoekstra, Albert, 4,707,915, Cl. 30-43.500.
Beckmann, Friedrich-Karl; Hoppe, Wolfgang; and Knochel, Reinhard, 4,708,471, Cl. 336-73.100.
Dirks, Albertus G.; and Brongersma, Hidde H., 4,709,363, Cl. 369-275.000.
Erman, Marko; Theeten, Jean-Bernard; and Vodjdani, Nakita, 4,708,423, Cl. 350-96.150.
Geerts, Wilhelmus H. M.; Stok, Filippus L.; and Tienkamp, Engbert, 4,709,260, Cl. 358-51.000.
Hartgring, Cornelius D.; and Joosten, Johannes J. M., 4,709,255, Cl. 357-23.500.
Hoeberechts, Arthur M. E.; Van Hal, Henricus A. M.; Tolner, Harm; and Van Gorkom, Gerardus G. P., 4,709,185, Cl. 313-346.00R.
Hucking, Ernst E.; and Klemmt, Karl-Heinz, 4,709,228, Cl. 340-365.00S.
Kaizer, Adrianus J. M.; and Van Leeuwen, Gerrit H., 4,709,391, Cl. 381-98.000.
Kasperkovitz, Wolfdietrich G., 4,709,163, Cl. 307-297.000.
Khoe, Giok D., 4,708,426, Cl. 350-96.180.
Kness, Werner; and Knees, Karl, 4,707,916, Cl. 30-43.920.
Rademaker, Gerrit; and van der Veer, Franciscus A. A., 4,709,154, Cl. 250-551.000.
Schiller, Claude, 4,709,384, Cl. 378-76.000.
Tietjens, Eduard W., 4,707,923, Cl. 30-346.510.
van Hoof, Leonardus A. H., 4,708,763, Cl. 156-616.00R.
Wouda, Kornelis J.; and Reijntjens, Wilhelmus J. M., 4,709,378, Cl. 375-110.000.
United Technologies Corporation: *See*—
Field, Thomas T.; Murrin, Thomas A.; and Ault, Earle A., 4,708,750, Cl. 148-11.50N.
Schwarz, Frederick M.; and Griffin, James G., 4,708,588, Cl. 415-115.000.
Suarez-Gonzalez, Ernesto, 4,708,474, Cl. 356-45.000.
Universal Forest Products: *See*—
Knoth, Wayne M.; and Corbin, Dennis O., 4,708,276, Cl. 227-7.000.
Universal Synetrics Corporation: *See*—
Mednis, Juris M., 4,708,253, Cl. 215-10.000.
University of Alabama, Board of Trustees of the: *See*—
Baker, David C.; Hand, Elli S.; Haugwitz, Rudiger D.; Narayanan, Venkatachala L.; and Rampal, Jang B., 4,709,033, Cl. 544-336.000.
University of California, Regents of: *See*—
Christian, Clifford N., 4,708,931, Cl. 435-7.000.
University of Missouri, The Curators of the: *See*—
Pippin, David J.; and Stindt, Diana J., 4,708,647, Cl. 433-32.000.
University Patents, Inc.: *See*—
Cohen, Gary H.; and Eisenberg, Roselyn J., 4,709,011, Cl. 530-324.000.
UOP Inc.: *See*—
Scott, Ray V., Jr.; Baumann, William M.; and House, David W., 4,709,003, Cl. 528-60.000.
Ward, Dennis J., 4,709,111, Cl. 585-503.000.
Zupancic, Joseph J.; Swedo, Raymond J.; and Petty-Weeks, Sandra, 4,708,981, Cl. 525-59.000.
Upson, Donald A.: *See*—
Myers, Drewfus Y., Jr.; Alexandrovich, Peter S.; Pearce, Glenn T.; Santilli, Domenic; Sreekumar, Chandrasekha; Berwick, Martin A.; Upson, Donald A.; and Goebel, William K., 4,708,923, Cl. 430-112.000.
Urabe, Hitoshi, to Fuji Photo Film Co., Ltd. Color picture reproduction with cut-off blue spectrum. 4,708,448, Cl. 354-75.000.
Uranit GmbH: *See*—
Zeller, Robert, 4,708,709, Cl. 494-32.000.
Urano, Shigeru, to Nippon Piston Ring Co., Ltd. Camshaft. 4,708,029, Cl. 74-567.000.
Urbani, William G., to Industrial Innovations, Inc. Vacuum loading cleaning system. 4,707,878, Cl. 15-302.000.
Urso, Joseph F.: *See*—
Fallis, Mary A.; Urso, Joseph F.; and Urso, Samuel J., 4,708,393, Cl. 297-452.000.
Urso, Samuel J.: *See*—
Fallis, Mary A.; Urso, Joseph F.; and Urso, Samuel J., 4,708,393, Cl. 297-452.000.
USM Corporation: *See*—
Braychak, Joseph J.; and Casey, John P., Sr., 4,708,553, Cl. 411-34.000.
Utsumi, Shigeo; Kanesaki, Tateo; Kagiyama, Takashi; Otonari, Satoshi; Ikushima, Koichiro; and Okumura, Norio, to Diafoil Company, Limited. Polyester films suitable for use in magnetic recording media. 4,708,902, Cl. 428-141.000.
Uya, Masaru: *See*—
Nishimichi, Yoshito; Uya, Masaru; and Kaneko, Katsuyuki, 4,709,173, Cl. 307-243.000.
Uzuhashi, Hideo: *See*—
Iizuka, Kenichi; Kitayama, Tooru; Uzuhashi, Hideo; and Aoki, Hideo, 4,709,317, Cl. 363-37.000.
Vahlbrauk, Wolfgang: *See*—
Sundermann, Erich; Laurien, Hanno; Vahlbrauk, Wolfgang; and Reye, Hans, 4,708,642, Cl. 432-95.000.
Vallourec: *See*—
Douchy, Michel, 4,708,897, Cl. 428-36.000.
Valmet-Strecker GmbH: *See*—
Goetz, Willi, 4,708,300, Cl. 242-58.100.
Valyocsik, Ernest W.: *See*—
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Van Cang, Luc P., to Thomson CSF. Variable-passband variable-phase digital filter. 4,709,343, Cl. 364-724.000.
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von Schuckmann, Alfred. Dispenser with finger slot. 4,708,507, Cl. 401-171.000.

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Vu, Thu V., to Harris Corporation. Apparatus for executing Chinese remainder theorem for residue decoding through quotient-remainder conversion. 4,709,345, Cl. 364-746.000.

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Willow Technology, Inc.: *See*—
Wurtz, William O., 4,708,268, Cl. 222-238.000.

Wilson, Eric G., to United Kingdom Atomic Energy Authority. Production of nitride dispersion strengthened alloys. 4,708,742, Cl. 75-252.000.

Wilson, John C.: *See*—
Kelley, Henry L.; and Wilson, John C., 4,708,305, Cl. 244-17.190.

Wilson, Keith B.: *See*—
Shenoy, Thirthahalli A.; and Wilson, Keith B., 4,707,994. Cl. 62-11.000.

Wilson, Kevin: *See*—
Elsworth, John K.; Nownahal, Ali; and Wilson, Kevin, 4,708,371, Cl. 285-13.000.

Wilson, Robert B.; and Pomeroy, William F., to Crucible Chemical Company. Disperse dye composition for use in solvent dyeing. 4,708,719, Cl. 8-580.000.

Wind Production Company: *See*—
Krolick, Robert S.; Storey, James S.; and LeFever, Robin E., 4,708,592, Cl. 416-176.00A.

Wing-Lynch, Inc.: *See*—
Wing, Ray D.; Lynch, Marine D.; Rawitzer, John A.; and Whitney, Mark D., 4,708,451, Cl. 354-312.000.

Wing, Ray D.; Lynch, Marine D.; Rawitzer, John A.; and Whitney, Mark D., to Wing-Lynch, Inc. Container for developing machine. 4,708,451, Cl. 354-312.000.

Withers, Gregory P.: *See*—
Los, Marinus; Long, Don W.; and Withers, Gregory P., 4,709,036, Cl. 546-167.000.

Wizards Ice Cream & Confectionery Shoppe, Ltd.: *See*—
Carlson, Gary, 4,708,489, Cl. 366-149.000.

Woertz, Hans, to Oskar Woertz, Inhaber Hans Woertz. Threadless electric terminal. 4,708,417, Cl. 439-828.000.

Wohl, Ronald A.: *See*—
Erhardt, Paul W.; Hagedorn, Alfred A., III; Lumma, William C., Jr.; and Wohl, Ronald A., 4,709,043, Cl. 548-318.000.

Wong, Pui K.; and Handlin, Dale L., Jr., to Shell Oil Company. Anionic polymerization process. 4,708,990, Cl. 525-250.000.

Wong, Pui K., to Shell Oil Company. Engineering thermoplastics containing pendant benzocyclobutene groups. 4,708,994, Cl. 525-392.000.

Wood, John: *See*—
Little, John D.; Little, Lorianne C.; and Wood, John, 4,708,893, Cl. 428-26.000.

Wood, Kenneth O., to Gerber Scientific Products, Inc. Coded web and associated web handling and working machine. 4,708,901, Cl. 428-131.000.

Wood, William E.: *See*—
Johnsen, John L.; Wood, William E.; Devletian, Jack H.; and Spring, Donald G., 4,708,282, Cl. 228-263.160.

Woodhead Industries, Inc.: *See*—
Eckart, George R., 4,708,663, Cl. 439-469.000.

Woods, Theodore E.; Cole, Jimmy R.; and Burcham, James T., to Systron, Inc. Controller for marine seismic cable. 4,709,355, Cl. 367-16.000.

Worner, Jorg, to Nukem GmbH. Photovoltaic cell and method of making same. 4,709,119, Cl. 136-260.000.

Wouda, Kornelis J.; and Reijntjens, Wilhelmus J. M., to U.S. Philips Corporation. Arrangement for generating a clock signal. 4,709,378, Cl. 375-110.000.

Wozniak, Walter J.: *See*—
Kulesza, Ralph J.; Wozniak, Walter J.; and Disko, Harry, 4,708,690, Cl. 446-351.000.

Wozniczka, George, to Zenith Electronics Corporation. PC board connector with shorting bus bar. 4,708,659, Cl. 439-62.000.

Wright, Raymond L.: *See*—
Twogood, Rodney L.; Wright, Raymond L.; and Rawle, Roger D., 4,707,900, Cl. 29-244.000.

Wu, Joseph M.: *See*—
Suhadolnik, Robert J.; Wu, Joseph M.; Doetsch, Paul; and Henderson, Earl E., 4,708,935, Cl. 435-91.000.

Wu, Leo: *See*—
Ma, John Y.; and Wu, Leo, 4,709,409, Cl. 455-325.000.

Wurtz, William O., to Willow Technology, Inc. Method and apparatus for the accurate volumetric feeding of materials. 4,709,268, Cl. 222-238.000.

Wuthrich, Alfred: *See*—
Muller, Kurt; Gruber, Peter; and Wuthrich, Alfred, 4,709,152, Cl. 250-342.000.

Wyatt, Hugh J. Baseball game apparatus. 4,708,344, Cl. 273-93.00R.

Xantech Corporation: *See*—
Seymour, Herbert E.; and Robbins, Michael S., 4,709,412, Cl. 455-603.000.

Xerox Corporation: *See*—
Bober, Henry T.; and Doery, Michael S., 4,708,469, Cl. 355-77.000.
Langdon, Michael J., 4,708,460, Cl. 355-10.000.
Stemmle, Denis J., 4,708,462, Cl. 355-24.000.
Stemmle, Denis J., 4,708,468, Cl. 355-72.000.

Xoma Corporation: *See*—
Baldwin, Robert W., 4,708,862, Cl. 424-1.100.

Yabe, Hisao: *See*—
Toda, Masato; and Yabe, Hisao, 4,708,126, Cl. 128-6.000.

Yagi, Shigeichi; and Shigeura, Junichi, to Mitsubishi Denki Kabushiki Kaisha. Method of controlling the mode of driving electric vehicles. 4,709,194, Cl. 318-52.000.

Yajima, Seiichi, to NEC Corporation. Loosely coupled multiprocessor system capable of transferring a control signal set by the use of a common memory. 4,709,325, Cl. 364-200.000.

Yamada, Kouzi: *See*—
Yamatsu, Isao; Abe, Shinya; Inai, Yuichi; Suzuki, Takeshi; Kinoshita, Kensaku; Mishima, Masnen; Katoh, Yoshinori; Kobayashi, Seiichi; Murakami, Manabu; and Yamada, Kouzi, 4,709,079, Cl. 560-66.000.

Yamada, Seiji: *See*—
Nakamura, Toru; Konishi, Satoshi; Yamada, Seiji; Tatsuoka, Masahiko; and Kubo, Michihiro, 4,708,215, Cl. 177-25.000.

Yamada, Tomozo: *See*—
Sumida, Seizi; Ono, Kaichi; Yoshida, Kazuu; and Yamada, Tomozo, 4,709,057, Cl. 549-262.000.

Yamagishi, Takashi: *See*—
Nishiii, Junji; and Yamagishi, Takashi, 4,708,942, Cl. 501-40.000.

Yamaguchi, Katsumi; Yokoi, Syouichiro; Kanai, Takao; and Yoshikawa, Kikuo, to Clarion Co., Ltd. Mode switching over gear mechanism for reel. 4,708,302, Cl. 242-204.000.

Yamaguchi, Keiki; and Tomita, Shozo, to Yokogawa Medical Systems, Limited. CRT multiformat camera. 4,709,271, Cl. 358-244.000.

Yamaguchi, Tetsurou; Yamamoto, Kohji; and Honda, Kiichiro, to Babcock-Hitachi Kabushiki Kaisha. Flame detector for use with a burner. 4,709,155, Cl. 250-554.000.

Yamaguro, Akira: *See*—
Momose, Yutaka; and Yamaguro, Akira, 4,708,639, Cl. 431-215.000.

Yamaguti, Yukio, to NEC Corporation. Package. 4,709,301, Cl. 361-387.000.

Yamaki, Masahiko, to Seikosha Co., Ltd. Electric flashlight. 4,709,309, Cl. 362-199.000.

Yamamoto, Akira: *See*—
Hamada, Shuji; and Yamamoto, Akira, 4,708,582, Cl. 414-786.000.

Yamamoto, Hironori: *See*—
Isohata, Junji; Yamamoto, Hironori; and Matsushita, Koichi, 4,708,465, Cl. 355-53.000.

Yamamoto, Kohji: *See*—
Yamaguchi, Tetsurou; Yamamoto, Kohji; and Honda, Kiichiro, 4,709,155, Cl. 250-554.000.

Yamamoto, Ryuta: *See*—
Yokoi, Shigeo; Isozaki, Takashi; Yamamoto, Ryuta; and Kawaguchi, Toshiyuki, 4,709,330, Cl. 364-400.000.

Yamamoto, Tatsuya: *See*—
Taniguchi, Akira; Ojio, Kuniji; Yamamoto, Tatsuya; and Sana, Toshikazu, 4,708,761, Cl. 156-516.000.

Yamamoto, Yasuo: *See*—
Kanno, Isao; and Yamamoto, Yasuo, 4,708,669, Cl. 440-1.000.

Yamamura, Hirohisa: *See*—
Kugo, Masaru; Ouchi, Hideyuki; Katogi, Kouzou; Igarashi, Osamu; Suda, Seiji; Tokuyama, Keiichi; and Yamamura, Hirohisa, 4,708,440, Cl. 350-339.00F.

Yamanaka, Tsutomu; and Yaoka, Osamu, to Yoshitomi Pharmaceutical Industries, Ltd. Ortho-aminomethylphenol compounds. 4,709,095, Cl. 564-253.000.

Yamano, Eiiti; and Yamauchi, Yoshihiko, to Ikeda Bussan Co., Ltd. Take-down seat for automobile. 4,708,387, Cl. 296-63.000.

Yamanouchi Pharmaceutical Co., Ltd.: *See*—
Nagano, Yoshinobu, 4,709,013, Cl. 530-332.000.

Yamashita, Akihiko; Ikegami, Masahiko; and Hatanaka, Kaoru, to Honda Giken Kogyo Kabushiki Kaisha. Electric component for motor vehicles. 4,709,123, Cl. 174-52.00R.

Yamashita, Tatsumaro, to Alps Electric Co., Ltd. Head height adjustment construction in magnetic recording and reproducing apparatus with rotary cylinder. 4,709,287, Cl. 360-109.000.

Yamato, Akihiro; and Nishikawa, Takafumi, to Honda Giken Kogyo K.K. Method of correcting air-fuel ratio for atmospheric pressure in internal combustion engines. 4,708,115, Cl. 123-494.000.

Yamatsu, Isao; Abe, Shinya; Inai, Yuichi; Suzuki, Takeshi; Kinoshita, Kensaku; Mishima, Mannen; Katoh, Yoshinori; Kobayashi, Seiichi; Murakami, Manabu; and Yamada, Kouzi, to Eisai Co., Ltd. Polyprenyl compounds, process for the production thereof and medicines containing same. 4,709,079, Cl. 560-66.000.

Yamauchi, Junnosuke: *See*—
Maruyama, Hitoshi; Ono, Isao; Kohno, Hiroji; Yamauchi, Junnosuke; and Okaya, Takuji, 4,708,947, Cl. 503-209.000.

Yamauchi, Yoshihiko: *See*—
Yamano, Eiiti; and Yamauchi, Yoshihiko, 4,708,387, Cl. 296-63.000.

Yamaura, Mitsuru; Inagaki, Junichi; and Ito, Hachidai, to Kabushiki Kaisha Toshiba. Digital protective relay system. 4,709,295, Cl. 361-80.000.
Yamazaki, Hiroshi: *See*—
Nagai, Tatsuo; Suzuki, Shinichi; and Yamazaki, Hiroshi, 4,708,924, Cl. 430-138.000.
Yan, Tsoung Y., to Mobil Oil Corporation. Removal of mercury from natural gas and liquid hydrocarbons utilizing downstream guard chabmer. 4,709,118, Cl. 585-820.000.
Yanagi, Hirofumi: *See*—
Moritani, Nakanobu; Sugita, Mitsuyuki; Hoshino, Isamu; Yanagi, Hirofumi; Ikeno, Hitoshi; and Konno, Tetsuro, 4,709,218, Cl. 331-116.0FE.
Yanagimoto, Takayuki: *See*—
Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Shiozumi, Motoji; Takahashi, Kunio; Torao, Akira; Moriya, Susumu; and Momose, Atsushi, 4,708,882, Cl. 427-1.000.
Yaoka, Osamu: *See*—
Yamanaka, Tsutomu; and Yaoka, Osamu, 4,709,095, Cl. 564-253.000.
Yard, Kenneth. Multipurpose boot for round-to-flat electrical cable. 4,708,664, Cl. 439-471.000.
Yasui, Ken K.; Williams, Neil R.; Ecklund, Richard C.; Hayase, Masashi; and Walkington, Robert J., to McDonnell Douglas Corporation. Volume control superplastic forming. 4,708,008, Cl. 72-60.000.
Yata, Yukio; and Suzuki, Shingo, to Mitsubishi Rayon Co., Ltd. Rear projection screen. 4,708,435, Cl. 350-129.000.
Yates, Jack: *See*—
Patterson, John F.; MacDuff, Robert B.; and Yates, Jack, 4,708,846, Cl. 376-444.000.
Yelf, Jack T.: *See*—
Lau, Kenneth K.; and Yelf, Jack T., 4,708,020, Cl. 73-852.000.
Yoda, Masashi: *See*—
Kawabe, Ryoichi; Iwasaki, Tetsuo; Kozuru, Hiroshi; Yoda, Masashi; Matsunaga, Masakazu; Takamori, Takesi; and Nakasima, Matao, 4,707,867, Cl. 4-313.000.
Yoda, Norio: *See*—
Tabata, Toshiyuki; Aikawa, Hiroshi; Fujiwara, Yoshinari; and Yoda, Norio, 4,708,329, Cl. 267-140.100.
Yoda, Yasutada; Sueyasu, Seisuke; and Futamura, Sadoji, to Bridgestone Corporation. Tire manufacturing mold. 4,708,609, Cl. 425-28.00D.
Yogo, Takeji; Nakagaki, Akitsuna; Miyazawa, Akio; Mitomo, Takeshi; and Ichihara, Takayuki, to Kabushiki Kaisha Tsuchiya Seisakusho. Heat exchanger. 4,708,199, Cl. 165-167.000.
Yokogawa Medical Systems, Limited: *See*—
Yamaguchi, Keiki; and Tomita, Shozo, 4,709,271, Cl. 358-244.000.
Yokoi, Shigeo; Isozaki, Takashi; Yamamoto, Ryuta; and Kawaguchi, Toshiyuki, to NGK Insulators Ltd. System for supervising and guiding persons in construction. 4,709,330, Cl. 364-400.000.
Yokoi, Syouichiro: *See*—
Yamaguchi, Katsumi; Yokoi, Syouichiro; Kanai, Takao; and Yoshikawa, Kikuo, 4,708,302, Cl. 242-204.000.
Yokoya, Hiroaki; Sano, Kenji; and Sato, Hideo, to Fuji Photo Film Co., Ltd. Electrophotographic photoreceptor comprises diarylamine photoconductor and styryl dye having tertiary amino moiety substituted with aryl groups. 4,708,922, Cl. 430-73.000.
Yokoyama, Hitoshi; and Iwanaga, Yukiya, to Fuji Oil Company, Limited. Method for preparing cheese flavor concentrate. 4,708,876, Cl. 426-33.000.
Yokoyama, Shigeyoshi: *See*—
Fukazawa, Tetsuo; and Yokoyama, Shigeyoshi, 4,708,585, Cl. 415-72.000.
Yokoyama, Yutaka: *See*—
Shinozaki, Fumihiko; and Yokoyama, Yutaka, 4,708,811, Cl. 252-62.200.
Yoneda, Hajime: *See*—
Fujiwara, Makoto; Yoneda, Hajime; and Okamoto, Masafumi, 4,709,303, Cl. 361-433.000.
Yonezawa, Kazuya: *See*—
Tomita, Haruo; Okamoto, Yasuo; and Yonezawa, Kazuya, 4,709,062, Cl. 549-553.000.
Yoshida, Kasumi; Takano, Nobuyoshi; and Ono, Naoya, to Hitachi, Ltd. Method and apparatus for clinical analysis. 4,708,940, Cl. 436-45.000.
Yoshida, Kazuo: *See*—
Sumida, Seizi; Ono, Kaichi; Yoshida, Kazuo; and Yamada, Tomozo, 4,709,057, Cl. 549-262.000.
Yoshida, Michiyuki: *See*—
Sugiura, Masahiro; and Yoshida, Michiyuki, 4,707,930, Cl. 33-623.000.
Yoshida, Ryo: *See*—
Nagano, Eiki; Yoshida, Ryo; Matsumoto, Hiroshi; Hashimoto, Shunichi; and Kamoshita, Katsuzo, 4,709,049, Cl. 548-513.000.
Yoshida, Shinya, to Omron Tateisi Electronics Co. IC card and financial transaction processing system using IC card. 4,709,137, Cl. 235-379.000.
Yoshida, Toshio, to Tsudakoma Kogyo Kabushiki Kaisha. Method and apparatus for controlling weft detection on a fluid jet loom. 4,708,173, Cl. 139-370.200.
Yoshihara, Kunio: *See*—
Takahashi, Kazuyoshi; Suzuki, Koji; Nagahira, Joji; Yoshihara, Kunio; Matsui, Toshiro; and Ishikawa, Tadashi, 4,709,319, Cl. 363-49.000.
Yoshii, Toshiyo; and Okabe, Kazuo, to Toray Industries, Inc. Metal-deposited laminated film and method for making capacitor elements using same. 4,708,905, Cl. 428-216.000.
Yoshiie, Shigeo: *See*—
Hirata, Tadashi; Matsukuma, Ikuo; Yoshiie, Shigeo; Sato, Kiyoshi; and Ohashi, Yoichi, 4,708,956, Cl. 514-210.000.
Yoshikawa, Kikuo: *See*—
Yamaguchi, Katsumi; Yokoi, Syouichiro; Kanai, Takao; and Yoshikawa, Kikuo, 4,708,302, Cl. 242-204.000.
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, to Kureha Kagaku Kogyo Kabushiki Kaisha. Pharmaceutical composition containing a derivative of orthoaminobenzoic acid as an active ingredient. 4,708,950, Cl. 514-42.000.
Yoshimoto, Masayuki; and Takagi, Toshiaki, to Terumo Kabushiki Kaisha. Material transfer apparatus of hollow fiber type. 4,708,796, Cl. 210-321.800.
Yoshinaka, Tadaaki, to Sony Corporation. Time base corrector. 4,709,276, Cl. 358-326.000.
Yoshioka, Hiroshi; Ono, Ichiro; and Uehara, Hitoshi, to Shin-Etsu Chemical Co., Ltd. Organosilicon compound having polysulfide linkages and a rubber composition comprising the same. 4,709,065, Cl. 556-428.000.
Yoshioka, Masahiro: *See*—
Satonaka, Shinobu; Takahashi, Masanobu; Wakikaido, Takahiro; and Yoshioka, Masahiro, 4,708,470, Cl. 355-77.000.
Yoshitomi Pharmaceutical Industries, Ltd.: *See*—
Yamanaka, Tsutomu; and Yaoka, Osamu, 4,709,095, Cl. 564-253.000.
Yoshitomi, Tetsuro: *See*—
Tanaka, Tsuneo; Yoshitomi, Tetsuro; Hanada, Koji; Ohashi, Mashato; and Hikosaka, Michichika, 4,708,903, Cl. 428-195.000.
Yoshitsugu, Noritada, to Toyota Jidosha Kabushiki Kaisha. Seatbelt assembly. 4,708,367, Cl. 280-804.000.
Younes, Usama E., to Atlantic Richfield Company. Method for the preparation of rigid non-cellular reaction injection molded thermoset polyisocyanurate compositions. 4,709,002, Cl. 528-53.000.
Young, Alan H.: *See*—
Brazier, John P.; Young, Alan H.; Viney, John E.; and Sutton, Gordon W., 4,708,638, Cl. 431-116.000.
Young, Elaine L.; and Spector, George. Artificial flower. 4,708,892, Cl. 428-24.000.
Young, Robert F.: *See*—
Dunham, William D.; Flaig, John D.; Petersen, H. Norman; and Young, Robert F., 4,708,673, Cl. 440-77.000.
Zacharczuk, Walter. Dashboard cover. 4,708,388, Cl. 296-97.00B.
Zakro, Joyce M.: *See*—
Bopst, John H., III; and Zakro, Joyce M., 4,708,265, Cl. 222-43.000.
Zambelli, Paolo, to Fini Elettrocostruzioni Meccaniche, S.p.A. Valve, particularly for air compressor. 4,708,606, Cl. 417-559.000.
Zandonatti, Raymond A.: *See*—
Morland, Mark R.; Cole, Paul A.; Cousins, Ivan J.; and Zandonatti, Raymond A., 4,708,661, Cl. 439-77.000.
Zankl, Wolfgang, to Dornier GmbH. Metallizing fiber re-inforced component. 4,708,778, Cl. 204-25.000.
Zarchy, Andrew S.; Volles, Warren K.; and O'Keefe, Luke F., to Union Carbide Corporation. Isomerization process and apparatus. 4,709,116, Cl. 585-738.000.
Zaruba, John V.; Hanson, Steven P.; and Kuna, Wayne A., to Marvin Glass & Associates. Portable game with captive parts. 4,708,348, Cl. 273-246.000.
Zeets, Joseph S.: *See*—
Powers, Richard G.; Zeets, Joseph S.; Currier, Joseph G.; and Alley, Lewis F., 4,708,296, Cl. 241-82.200.
Zeller, Robert, to Uranit GmbH. Method and apparatus for the infinitely variable setting of the tails U^{235} concentration of gas centrifuge cascades for the separation of uranium isotopes. 4,708,709, Cl. 494-32.000.
Zenith Electronics Corporation: *See*—
Konopka, John G., 4,709,320, Cl. 363-56.000.
Wozniczka, George, 4,708,659, Cl. 439-62.000.
Ziegelmeyer, Harold R. Driving sprocket for conveyor chain on finger jointing machines. 4,708,698, Cl. 474-152.000.
Ziegenhorn, Joachim: *See*—
Siedel, Joachim; Staepels, Johnny; and Ziegenhorn, Joachim, 4,708,939, Cl. 436-13.000.
Ziegler, Michael J.; and Simpkins, F. Richard, to AGA AB. Apparatus for blow molding glass articles. 4,708,730, Cl. 65-261.000.
Zils, James A.: *See*—
Pamer, W. Richard; and Zils, James A., 4,708,556, Cl. 411-179.000.
Zimmerman, Roger W.: *See*—
Kellogg, Robert L.; Zimmerman, Roger W.; and Bryan, Carney J., 4,708,073, Cl. 112-262.300.
Zimmermann, Jeffery D.: *See*—
Bills, Randall C.; Bumgardner, Teddy E.; Monroe, Lusbert L.; and Zimmermann, Jeffery D., 4,708,222, Cl. 187-1.00R.
Zupancic, Joseph J.; Swedo, Raymond J.; and Petty-Weeks, Sandra, to UOP Inc. Water insoluble proton conducting polymers. 4,708,981, Cl. 525-59.000.
Zwaan, Paul: *See*—
Elsworth, Adrian J.; Daniell, Michael G.; Zwaan, Paul; and Stewart, David P. M., 4,708,831, Cl. 261-130.000.
Zwaga, Bocke: *See*—
Almering, Petrus C. M.; and Zwaga, Bocke, 4,709,158, Cl. 307-200.00A.
Zweifel, Terry L., to Sperry Corporation. Descent flight path control for aircraft. 4,709,336, Cl. 364-433.000.
501 A/s Moss Glasveark: *See*—
Janitz, Bernt, 4,708,014, Cl. 73-37.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 24TH DAY OF NOVEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Barry Wright Corporation: *See*—
Roake, Joseph C., Re. 32,546, Cl. 74-89.150.

Bishop, David C.; and Heywood, Alan E., to Johnson Matthey & Co., Limited. Foldable metallic gauze pack and segment. Re. 32,549, Cl. 428-594.000.

Hepworth, Paul S.; and Whitehouse, Martin G., to Plas Plugs Ltd. Tile parting devices. Re. 32,548, Cl. 125-23.00T.

Heywood, Alan E.: *See*—
Bishop, David C.; and Heywood, Alan E., Re. 32,549, Cl. 428-594.000.

Johnson Matthey & Co., Limited: *See*—
Bishop, David C.; and Heywood, Alan E., Re. 32,549, Cl. 428-594.000.

Plas Plugs Ltd.: *See*—
Hepworth, Paul S.; and Whitehouse, Martin G., Re. 32,548, Cl. 125-23.00T.

Reed, Max: *See*—
Reed, Robert C.; and Reed, Max, Re. 32,547, Cl. 119-29.000.

Reed, Robert C.; and Reed, Max. Animal exercising harness. Re. 32,547, Cl. 119-29.000.

Rhone-Poulenc Agrochimie: *See*—
Theissen, Robert J., Re. 32,550, Cl. 564-166.000.

Roake, Joseph C., to Barry Wright Corporation. Apparatus for securing an electronic unit to an avionics tray. Re. 32,546, Cl. 74-89.150.

Theissen, Robert J., to Rhone-Poulenc Agrochimie. Halophenoxy benzamide herbicides. Re. 32,550, Cl. 564-166.000.

Whitehouse, Martin G.: *See*—
Hepworth, Paul S.; and Whitehouse, Martin G., Re. 32,548, Cl. 125-23.00T.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Bosker, Hans. System for denture support using a transmandibular implant. B1 4,516,937, 11-24-87, Cl. 433-173.000.

LIST OF DESIGN PATENTEES

AB Electrolux: *See*—
Johansson, Jan E., 292,863, Cl. D7-338.000.

Ahlman, Tomas: *See*—
Lagerbielke, Erika; and Ahlman, Tomas, 292,919, Cl. D14-53.000.

Airway Industries, Inc.: *See*—
Kim, Hyun S., 292,845, Cl. D3-48.000.
Kim, Hyun S., 292,846, Cl. D3-48.000.
Kim, Hyun S., 292,848, Cl. D3-76.000.
Wilhoit, William H., 292,844, Cl. D3-48.000.

Alberico, Daryl D. Irrigation water drainage unit. 292,934, 11-24-87, Cl. D23-259.000.

Amada Company, Limited: *See*—
Taguchi, Masayuki, 292,931, Cl. D15-134.000.

Argondezzi, Robert. Pair of wings for an airplane. 292,911, 11-24-87, Cl. D12-345.000.

Armstrong World Industries, Inc.: *See*—
Schouten, Gerard M., 292,887, Cl. D9-424.000.

Arrow Commerce Company, Ltd.: *See*—
Yosida, Takatsugu, 292,924, Cl. D14-68.000.

Aubrey, Kenneth R., to Cubic Western Data. Fare collection ticket transport. 292,939, 11-24-87, Cl. D99-99.000.

Avery, Ronald G.: *See*—
Ronn, Benjamin T.; Avery, Ronald G.; and O'Grady, Richard M., 292,892, Cl. D10-106.000.

Baker, David S.: *See*—
Dickie, Paul; Baker, David S.; and Murta, Donna, 292,849, Cl. D3-100.000.

Bakula, Mark S.; Doman, Donald W.; Ellingen, David R.; Hopp, Gene P.; Malek, Keith R.; Michalski, Steven E.; Pacetti, Larry D.; Pagac, William T.; Wente, Steven R.; and Zuzinec, Raymond R., Sr., to Snap-on Tools Corporation. Timing light. 292,893, 11-24-87, Cl. D10-112.000.

Barker, R. Marshall. Shoulder bags. 292,847, 11-24-87, Cl. D3-52.000.

Barnett, David J., to Mike & Kremmel Ltd. Can opener. 292,866, 11-24-87, Cl. D8-41.000.

Benchcraft, Inc.: *See*—
Waldron, Patrick, 292,855, Cl. D6-381.000.

Best, Philip C.; Neu, Edwin F.; and Pardo, John, to Procter & Gamble Company, The. Bottle. 292,885, 11-24-87, Cl. D9-376.000.

Bielby, Kim J. Combined running board and step. 292,904, 11-24-87, Cl. D12-203.000.

Blackburn, James R.; and Gentes, James, to Jim Blackburn Designs, Inc. Pair of front pannier support racks for bicycles. 292,900, 11-24-87, Cl. D12-158.000.

Bourke, Alan M.: *See*—
Sexton, John D.; and Bourke, Alan M., 292,841, Cl. D2-270.000.

Brehm, Justin: *See*—
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Brown, Randy J.: *See*—
Whitmer, John H.; and Brown, Randy J., 292,894, Cl. D10-113.000.

Brynel Incorporated: *See*—
Glasberg, Myron, 292,850, Cl. D4-128.000.

Burns, Ronald R.; and Graves, Robert P., Jr., to Viskase Corporation. Bag dispensing carton. 292,888, 11-24-87, Cl. D9-432.000.

Burnstein, Philip J.; and Kim, Syng N., to Wico Distribution Company, L.P. Mouse for controlling the cursor on computer display screen. 292,927, 11-24-87, Cl. D14-114.000.

C. & T. Tariton, Inc.: *See*—
Tarlton, Curtis S.; and Ford, Richard A., 292,938, Cl. D34-29.000.

Cafaro, John A.; Schell, Richard A.; and Spaulding, Robert B., to General Motors Corporation. Wheel cover. 292,907, 11-24-87, Cl. D12-211.000.

Carbone, Luigi. Boat guide roller assembly. 292,870, 11-24-87, Cl. D8-354.000.

Cerberus AG: *See*—
Ronn, Benjamin T.; Avery, Ronald G.; and O'Grady, Richard M., 292,892, Cl. D10-106.000.

Chen, Lien-Ti, to Nan Zong Leather Products Co., Ltd. Castor for luggage or similar articles. 292,873, 11-24-87, Cl. D8-375.000.

Cheng, Ching-Yuan. Combination lock. 292,868, 11-24-87, Cl. D8-331.000.

Clauss, Ulrich. Rail assembly for awning or similar article. 292,874, 11-24-87, Cl. D8-377.000.

Club Car, Inc.: *See*—
Samuelson, Donald G.; Saporito, Dominic; and Brehm, Justin, 292,899, Cl. D12-16.000.

Codman & Shurtleff Inc.: *See*—
McGinley, Joseph A., 292,932, Cl. D19-62.000.

Commisso, Nicholas D.; De Cook, Edwin R.; Hisle, Ralph E.; and Rowe, Donald, to McDonald's Corporation. Dual compartment sandwich package. 292,878, 11-24-87, Cl. D9-341.000.
Cubic Western Data: *See*—
Aubrey, Kenneth R., 292,939, Cl. D99-99.000.
Culbertson, Richard: *See*—
Schaefer, Henry A.; and Culbertson, Richard, 292,923, Cl. D14-68.000.
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Dickie, Paul; Baker, David S.; and Murta, Donna. Shotgun shell holder. 292,849, 11-24-87, Cl. D3-100.000.
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Dorper, Heinrich. Knife rest or similar article. 292,861, 11-24-87, Cl. D7-73.000.
Drake, Anthony F. Airplane. 292,909, 11-24-87, Cl. D12-319.000.
Ellingen, David R.: *See*—
Bakula, Mark S.; Doman, Donald W.; Ellingen, David R.; Hopp, Gene P.; Malek, Keith R.; Michalski, Steven E.; Pacetti, Larry D.; Pagac, William T.; Wente, Steven R.; and Zuzinec, Raymond R., Sr., 292,893, Cl. D10-112.000.
Envall, Bjorn E. A.; and Wardle, Geoffrey P., to Saab-Scania Aktiebolag. Wheel. 292,905, 11-24-87, Cl. D12-206.000.
Fabrique Ebel, Societe Anonyme: *See*—
Schoepfer, Eddy, 292,890, Cl. D10-39.000.
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Ford, Richard A.: *See*—
Tarlton, Curtis S.; and Ford, Richard A., 292,938, Cl. D34-29.000.
Frezza, Richard. Case for a golf accessory kit. 292,843, 11-24-87, Cl. D3-37.000.
Frick, Donald; and Jackson, George R., to World-Wide Plastics, Inc. Manometer. 292,891, 11-24-87, Cl. D10-101.000.
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Gard, Gary W. Cabinet door or similar article. 292,857, 11-24-87, Cl. D6-494.000.
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Gillespie, Lionel D.; Golley, Frank B., IV; Snoke, Phillip J.; and Timmerman, Kenneth D., to Lockheed Corporation. Combined data transmitter/receiver modem and security modem for prevention of unauthorized computer access. 292,926, 11-24-87, Cl. D14-107.000.
Glasberg, Myron, to Brynel Incorporated. Hairbrush. 292,850, 11-24-87, Cl. D4-128.000.
Golley, Frank B., IV: *See*—
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Graham, Rick, to TeleQuest, Inc. Telephone. 292,918, 11-24-87, Cl. D14-53.000.
Grambush, Douglas H.; and Moore, Alix A., to Fujitsu Limited. Portable telephone set. 292,922, 11-24-87, Cl. D14-64.000.
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Burns, Ronald R.; and Graves, Robert P., Jr., 292,888, Cl. D9-432.000.
Griffin, Christopher J.; Perigo, John A.; and Tucker, Geoffrey, to Metal Box Public Limited Co. Container for food products. 292,883, 11-24-87, Cl. D9-349.000.
Gross, Richard A., to Pittway Corporation. Dispensing container closure. 292,882, 11-24-87, Cl. D9-435.000.
Grunhut, Ernest. Candy package. 292,876, 11-24-87, Cl. D9-337.000.
Grunhut, Ernest. Candy package. 292,877, 11-24-87, Cl. D9-337.000.
Hayashi, Takatoshi, to Kobishi Electric Co., Ltd. Siren. 292,895, 11-24-87, Cl. D10-120.000.
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Jasinski, Donald A. Table. 292,856, 11-24-87, Cl. D6-484.000.
Jim Blackburn Designs, Inc.: *See*—
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Kasai, Kazumi, to Nippon Notion Kogyo Co. Ltd. Buckle. 292,898, 11-24-87, Cl. D11-216.000.
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Kemp, Willard E. Gate valve. 292,933, 11-24-87, Cl. D23-244.000.
Kemp, Willard E. Gate valve. 292,935, 11-24-87, Cl. D23-244.000.
Kim, Hyun S., to Airway Industries, Inc. Luggage case. 292,845, 11-24-87, Cl. D3-48.000.
Kim, Hyun S., to Airway Industries, Inc. Luggage case. 292,846, 11-24-87, Cl. D3-48.000.
Kim, Hyun S., to Airway Industries, Inc. Attache case. 292,848, 11-24-87, Cl. D3-76.000.
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Kiwi Polish Company Pty. Ltd., The: *See*—
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Ladson, Larry C. Container for holding a spray can. 292,875, 11-24-87, Cl. D9-317.000.
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Moar, John R. Boat. 292,908, 11-24-87, Cl. D12-300.000.
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Wente, Steven R.: *See*—
Bakula, Mark S.; Doman, Donald W.; Ellingen, David R.; Hopp, Gene P.; Malek, Keith R.; Michalski, Steven E.; Pacetti, Larry D.; Pagac, William T.; Wente, Steven R.; and Zuzinec, Raymond R., Sr., 292,893, Cl. D10-112.000.
Whitmer, John H.; and Brown, Randy J., to Industrial Plastics Corporation. Flexible traffic delineator post. 292,894, 11-24-87, Cl. D10-113.000.
Wico Distribution Company, L.P.: *See*—
Burnstein, Philip J.; and Kim, Syng N., 292,927, Cl. D14-114.000.
Wilhoit, William H., to Airway Industries, Inc. Luggage case. 292,844, 11-24-87, Cl. D3-48.000.
World-Wide Plastics, Inc.: *See*—
Frick, Donald; and Jackson, George R., 292,891, Cl. D10-101.000.
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Wright, David; and Latino, Richard M., 292,858, Cl. D6-511.000.
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Yoneda, Yoshihide, to Maruzen Sewing Machine Co., Ltd. Sewing machine. 292,929, 11-24-87, Cl. D15-69.000.
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Yosida, Takatsugu, to Arrow Commerce Company, Ltd. AM stereophonic signal converter. 292,924, 11-24-87, Cl. D14-68.000.
Zuzinec, Raymond R., Sr.: *See*—
Bakula, Mark S.; Doman, Donald W.; Ellingen, David R.; Hopp, Gene P.; Malek, Keith R.; Michalski, Steven E.; Pacetti, Larry D.; Pagac, William T.; Wente, Steven R.; and Zuzinec, Raymond R., Sr., 292,893, Cl. D10-112.000.

CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 24, 1987

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

8 4,707,860
16 4,707,861
93 4,707,862
436 4,707,863

CLASS 4

144.3 4,707,864
228 4,707,865
4,707,866
313 4,707,867
362 4,707,868
505 4,707,869
661 4,707,870

CLASS 5

3 4,707,871
451 4,707,872
502 4,707,873

CLASS 8

580 4,708,719

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142 E 4,707,874

CLASS 15

179 4,707,875
250.23 4,707,876
261 4,707,877
302 4,707,878
345 4,707,879

CLASS 16

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66 4,707,882
110 R 4,707,883
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21 4,707,885
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CLASS 19

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80 R 4,707,888

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30.5 R 4,707,889
122.6 4,707,890
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155 R 4,707,898
157 C 4,707,899
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446 4,707,905
453 4,707,906
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726 4,707,912
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264 4,707,936

CLASS 40

152.1 4,707,937
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591 4,707,939
605 4,707,940

CLASS 42

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CLASS 43

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741 4,707,963
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430 4,707,968
449 4,707,969
529 4,707,970

CLASS 55

40 4,708,721
89 4,708,722
321 4,708,723
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CLASS 56

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10.2 4,707,972
328 R 4,707,973
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CLASS 57

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206 4,707,980
242 4,707,981
258 4,707,982
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274 4,707,984
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413 4,707,988
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11 4,707,994
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341 4,707,997
349 4,707,998
474 4,707,999
480 4,708,000

CLASS 63

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CLASS 65

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CLASS 66

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192 4,708,003

CLASS 70

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238 4,708,005
303 R 4,708,006
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63 4,708,011
149 4,708,016
438 4,708,017
439 4,708,018
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852 4,708,020
861.06 4,708,021
861.28 4,708,022
863.31 4,708,023

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44 4,708,025
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359 4,708,026
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567 4,708,029
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15.8 4,708,035
57.38 4,708,036

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41.01 4,708,052

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331 4,708,061
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516 4,708,063
517 4,708,064
529 4,708,065

CLASS 105

215.2 4,708,066

CLASS 106

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14.12 4,708,744
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CLASS 110

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CLASS 112

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121.27 4,708,072
262.3 4,708,073
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352 4,708,087

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CLASS 122

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193 P 4,708,104
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92 YF 4,708,132
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303.15 4,708,137
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305.1 4,708,139
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334 R 4,708,141
419 D 4,708,145
419 PG 4,708,143
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419 PT 4,708,142
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109.1 4,708,198
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65.1 4,708,201
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241 4,708,203
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273 4,708,205
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CLASS 177

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CLASS 187

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468.2 4,708,236
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835 4,708,238

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CLASS 203

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CLASS 204

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120 4,708,786
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592 4,708,250

CLASS 210

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96.2 4,708,791
150 4,708,792
188 4,708,793
189 4,708,794
304 4,708,795
321.8 4,708,796
330 4,708,797
385 4,708,798
500.23 4,708,799
4,708,800
636 4,708,801
641 4,708,802
650 4,708,803
677 4,708,804
698 4,708,805
754 4,708,806

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182 4,708,251

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13.1 4,708,254
329 4,708,255

CLASS 219

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69 W 4,709,130
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125.1 4,709,133
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113 4,708,272

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252 4,708,273
273 4,708,274

CLASS 226

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CLASS 227

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263.16 4,708,282

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1.1 4,708,419
6.6 4,708,420
96.15 4,708,421
4,708,422
4,708,423
96.16 4,708,424
4,708,425
96.18 4,708,426
96.20 4,708,427
4,708,428
4,708,429
4,708,430
4,708,431
96.21 4,708,432
96.22 4,708,433
96.26 4,708,434
129 4,708,435
162.17 4,708,436
162.23 4,708,437
174 4,708,438
331 R 4,708,439
339 F 4,708,440
346 4,708,441
422 4,708,442
427 4,708,443
4,708,444
454 4,708,445

CLASS 351

158 4,708,446

CLASS 352

128 4,708,447

CLASS 354

75 4,708,448
122 4,708,449
303 4,708,450
312 4,708,451
317 4,708,452
320 4,708,453
422 4,708,454

CLASS 355

3 DD 4,708,458
3 R 4,708,455
3 SH 4,708,456
3 TR 4,708,457
4 4,708,459
10 4,708,460
14 R 4,708,461
24 4,708,462
45 4,708,463
4,708,464
53 4,708,465
4,708,466
4,708,467
72 4,708,468
77 4,708,469
4,708,470

CLASS 356

2 4,708,472
5 4,708,473
45 4,708,474
73.1 4,708,476
222 4,708,477
244 4,708,478
350 4,708,479
4,708,480
358 4,708,481
376 4,708,482
4,708,483
401 4,708,484
417 4,708,475
440 4,708,485

CLASS 357

22 4,709,251
23.5 4,709,255
30 4,709,252
68 4,709,253
72 4,709,254

CLASS 358

11	4,709,256
23	4,709,257
27	4,709,258
48	4,709,259
51	4,709,260
66	4,709,261
74	4,709,262
88	4,709,263
93	4,709,264
108	4,709,265
148	4,709,267
150	4,709,268
167	4,709,269
188	4,709,270
244	4,709,271
247	4,709,272
256	4,709,273
283	4,709,274
296	4,708,486
310	4,709,275
326	4,709,276

CLASS 360

14.3	4,709,277
26	4,709,278
78	4,709,279
85	4,709,280
97	4,709,281
	4,709,282
99	4,709,283
103	4,709,284
104	4,709,285
105	4,709,286
109	4,709,287
130.21	4,709,288
130.24	4,709,289
132	4,709,290

CLASS 361

2	4,709,291
22	4,709,292
50	4,709,293
58	4,709,294
80	4,709,295
102	4,709,296
212	4,709,297
213	4,709,298
321	4,709,299
387	4,709,301
388	4,709,302
398	4,709,300
433	4,709,303

CLASS 362

32	4,709,304
61	4,709,305
68	4,709,306
103	4,709,307
148	4,709,308
199	4,709,309
205	4,709,310
277	4,709,311
298	4,709,312
414	4,709,313

CLASS 363

14	4,709,314
21	4,709,315
	4,709,316
37	4,709,317
	4,709,318
49	4,709,319
56	4,709,320
	4,709,321
86	4,709,322
97	4,709,323

CLASS 364

200	4,709,324
	4,709,325
	4,709,326
	4,709,327
	4,709,328
	4,709,329
400	4,709,330
413	4,709,331
414	4,709,332
	4,709,333
431.05	4,709,334
	4,709,335
433	4,709,336
468	4,709,337
483	4,709,338
492	4,709,339
513.5	4,709,340
550	4,709,341
558	4,709,342
724	4,709,343
	4,709,344
746	4,709,345
784	4,709,346
900	4,709,347
	4,709,348
	4,709,349

CLASS 365

45	4,709,350
51	4,709,351
104	4,709,352
205	4,709,353
226	4,709,354

CLASS 366

2	4,708,488
149	4,708,489
206	4,708,487

CLASS 367

16	4,709,355
19	4,709,356
35	4,709,357
106	4,709,358
155	4,709,359
157	4,709,360
165	4,709,361
189	4,709,362

CLASS 368

28	4,708,490
156	4,708,491
282	4,708,492

CLASS 369

275	4,709,363

CLASS 370

85	4,709,364

CLASS 371

11	4,709,365
20	4,709,366
38	4,709,367

CLASS 372

10	4,709,368
38	4,709,369
	4,709,370
44	4,709,371
58	4,709,372
86	4,709,373

CLASS 374

128	4,708,493
154	4,708,495
161	4,708,494

CLASS 375

13	4,709,374
27	4,709,375
58	4,709,376
75	4,709,377
110	4,709,378

CLASS 376

203	4,708,842
219	4,708,843
247	4,708,844
435	4,708,845
444	4,708,846

CLASS 377

3	4,709,379
58	4,709,380
62	4,709,381

CLASS 378

	4,709,382
72	4,709,383
76	4,709,384
99	4,709,385

CLASS 379

24	4,709,386
354	4,709,387
413	4,709,388
424	4,709,389

CLASS 380

20	4,709,266

CLASS 381

51	4,709,390
98	4,709,391
193	4,709,392

CLASS 382

41	4,709,393
49	4,709,394
54	4,709,395

CLASS 383

5	4,709,396
	4,709,397
63	4,709,398
66	4,709,399
77	4,709,400

CLASS 384

303	4,708,496
448	4,708,497
539	4,708,499
560	4,708,498

CLASS 400

120	4,708,500
157.2	4,708,501
175	4,708,502
531	4,708,503
637	4,708,504
697.1	4,708,505

CLASS 401

151	4,708,506
171	4,708,507
199	4,708,508

CLASS 402

4	4,708,509

CLASS 403

90	4,708,510
316	4,708,511
344	4,708,512
361	4,708,513
372	4,708,514

CLASS 404

6	4,708,515
31	4,708,516
64	4,708,517
79	4,708,518
101	4,708,519
103	4,708,520

CLASS 405

31	4,708,521
55	4,708,522
	4,708,523
169	4,708,524
195	4,708,525
202	4,708,526
216	4,708,527
230	4,708,528
240	4,708,529
252	4,708,530
296	4,708,531
303	4,708,532
	4,708,533

CLASS 406

75	4,708,534
93	4,708,535

CLASS 407

41	4,708,536
46	4,708,537

CLASS 408

59	4,708,538
61	4,708,539
72 B	4,708,540
83.5	4,708,541
144	4,708,542
151	4,708,543

CLASS 409

12	4,708,544
131	4,708,545
200	4,708,546
233	4,708,547
234	4,708,548

CLASS 410

105	4,708,549

CLASS 411

3	4,708,550
32	4,708,551
34	4,708,553
60	4,708,552
84	4,708,554
149	4,708,555
179	4,708,556
387	4,708,557
457	4,708,558
545	4,708,559

CLASS 412

7	4,708,560
25	4,708,561

CLASS 414

10	4,708,562
22	4,708,563
36	4,708,564
86	4,708,565
276	4,708,566
310	4,708,567
330	4,708,568
332	4,708,569
408	4,708,570
412	4,708,571
540	4,708,572
589	4,708,573
591	4,708,574
607	4,708,575
	4,708,576
635	4,708,577
720	4,708,578
723	4,708,579
735	4,708,580
786	4,708,581
	4,708,582
	4,708,583

CLASS 415

53 R	4,708,584
72	4,708,585
	4,708,586
104	4,708,587
115	4,708,588
199.2	4,708,589
219 C	4,708,590

CLASS 416

102	4,708,591
176 A	4,708,592
183	4,708,593

CLASS 417

53	4,708,594
109	4,708,595
218	4,708,596
259	4,708,597
295	4,708,598
	4,708,599
322	4,708,600
393	4,708,601
407	4,708,602
415	4,708,603
477	4,708,604
500	4,708,605
559	4,708,606

CLASS 418

55	4,708,607

CLASS 420

129	4,708,847
585	4,708,848

CLASS 422

26	4,708,849
61	4,708,850
72	4,708,886
123	4,708,851
220	4,708,852

CLASS 423

210	4,708,853
235	4,708,854
	4,708,855
242	4,708,856
277	4,708,857
300	4,708,858
339	4,708,859
579	4,708,860

CLASS 424

1.1	4,708,861
	4,708,862
47	4,708,863
49	4,708,864
59	4,708,865
61	4,708,866
80	4,708,867
81	4,708,869
	4,708,870
88	4,708,871
115	4,708,872
195.1	4,708,873
470	4,708,874

CLASS 425

14	4,708,608
28 B	4,708,610
28 D	4,708,609
62	4,708,611
117	4,708,612
	4,708,613
120	4,708,614
131.1	4,708,615
133.5	4,708,616
	4,708,618
135	4,708,617
141	4,708,619
154	4,708,620
183	4,708,621
185	4,708,622
202	4,708,623
306	4,708,624
398	4,708,626
405 H	4,708,627
406	4,708,628
466	4,708,629
504	4,708,630
542	4,708,631
556	4,708,632
574	4,708,633
589	4,708,625

CLASS 426

12	4,708,875
33	4,708,876
69	4,708,877
231	4,708,878
335	4,708,879
424	4,708,880
524	4,708,881

CLASS 427

1	4,708,882
38	4,708,883
39	4,708,884
58	4,708,885
118	4,708,887
126.1	4,708,888
140	4,708,889
230	4,708,890
245	4,708,891

CLASS 428

24	4,708,892
26	4,708,893
31	4,708,894
	4,708,895
35	4,708,896
36	4,708,897
	4,708,898
60	4,708,899
74	4,708,900
131	4,708,901
141	4,708,902
195	4,708,903
209	4,708,904
216	4,708,905
336	4,708,906
352	4,708,907
423.1	4,708,908
423.9	4,708,909
453	4,708,910
542.8	4,708,911
547	4,708,912
594	Re.32,549
607	4,708,913
690	4,708,914
698	4,708,915

CLASS 429

38	4,708,916
40	4,708,917
210	4,708,918

CLASS 430

5	4,708,919
11	4,708,920
70	4,708,921
73	4,708,922
112	4,708,923
138	4,708,924
270	4,708,925
306	4,708,926
564	4,708,927
619	4,708,928

CLASS 431

1	4,708,634
	4,708,635
20	4,708,636
116	4,708,637
	4,708,638
215	4,708,639

CLASS 432

14	4,708,640
72	4,708,641
95	4,708,642
	4,708,643
106	4,708,644
152	4,708,645

CLASS 433

19	4,708,646
32	4,708,647
49	4,708,648
71	4,708,649
90	4,708,650
157	4,708,651
165	4,708,653
173	B1 4,516,937
201.1	4,708,652
213	4,708,654
225	4,708,655

CLASS 434

45	4,708,656
185	4,708,657

CLASS 435

5	4,708,818
7	4,708,929
	4,708,930
	4,708,931
	4,708,932
	4,708,933
68	4,708,934
91	4,708,935
128	4,708,936
188	4,708,937
311	4,708,938

CLASS 436

13	4,708,939
45	4,708,940
141	4,708,941

CLASS 437

18	4,708,767
19	4,708,747
109	4,707,909
228	4,708,768

CLASS 439

21	4,708,658
62	4,708,659
65	4,708,660
77	4,708,661
95	4,708,412
353	4,708,662
358	4,708,413
394	4,708,414
469	4,708,663
471	4,708,664
551	4,708,665
580	4,708,666
633	4,708,415
785	4,708,418
788	4,708,667
825	4,708,668
828	4,708,417
851	4,708,416

CLASS 440

1	4,708,669
6	4,708,670
41	4,708,671
51	4,708,672
77	4,708,673
88	4,708,674

CLASS 441

65	4,708,675
67	4,708,676

CLASS 445

3	4,708,677
24	4,708,678
26	4,708,679
47	4,708,680
50	4,708,681

CLASS 446

36	4,708,682
75	4,708,683
127	4,708,684
139	4,708,685
166	4,708,686
260	4,708,687
288	4,708,688
301	4,708,689
351	4,708,690
488	4,708,691

CLASS 455

51	4,709,401
	4,709,402
126	4,709,403
	4,709,404
151	4,709,405
208	4,709,406
226	4,709,407
260	4,709,408
325	4,709,409
333	4,709,410
601	4,709,411
603	4,709,412
606	4,709,413
607	4,709,414
	4,709,415
609	4,709,416
611	4,709,417
612	4,709,418

CLASS 464

69	4,708,692
111	4,708,693

CLASS 474

28	4,708,694
101	4,708,695
103	4,708,696
135	4,708,697
144	4,708,699
152	4,708,698
205	4,708,700
245	4,708,701
261	4,708,702
268	4,708,703

CLASS 493

151	4,708,704
211	4,708,705
295	4,708,706
313	4,708,707
357	4,708,708

CLASS 494

32	4,708,709
37	4,708,710
41	4,708,711
45	4,708,712

CLASS 501

40	4,708,942

98 4,708,943

CLASS 502

7 4,708,944
263 4,708,945
304 4,708,946

CLASS 503

209 4,708,947

CLASS 512

12 4,708,821

CLASS 514

2 4,708,948
26 4,708,949
42 4,708,950
57 4,708,951
158 4,708,952
166 4,708,953
183 4,708,954
202 4,708,955
210 4,708,956
264 4,708,957
274 4,708,958
373 4,708,959
383 4,708,960
423 4,708,961
475 4,708,962
530 4,708,963
533 4,708,964
563 4,708,965
689 4,708,966

CLASS 521

56 4,708,967
60 4,708,968
82 4,708,969
123 4,708,970
167 4,708,971
185 4,708,972

CLASS 523

102 4,708,973
130 4,708,974
216 4,708,975
300 4,708,976
402 4,708,977

CLASS 524

5 4,708,978
249 4,708,979
412 4,708,980

CLASS 525

59 4,708,981
92 4,708,982
101 4,708,983
127 4,708,984
166 4,708,985
177 4,708,986
184 4,708,987
194 4,708,988
199 4,708,989
250 4,708,990
275 4,708,991
313 4,708,992
356 4,708,993
392 4,708,994
450 4,708,995
530 4,708,996

CLASS 526

207 4,708,997
287 4,708,998
320 4,708,999
4,709,000

CLASS 528

15 4,709,001
53 4,709,002
60 4,709,003
185 4,709,004
194 4,709,005
208 4,709,006
222 4,709,007
422 4,709,008
481 4,709,009

CLASS 530

323 4,709,010
324 4,709,011
328 4,709,012
332 4,709,013
333 4,709,014
350 4,709,017
387 4,709,015
389 4,709,016

CLASS 534

618 4,709,018
655 4,709,019

CLASS 536

17.8 4,709,020

CLASS 540

141 4,709,021
145 4,709,022
224 4,709,023
355 4,709,025
536 4,709,024

CLASS 544

3 4,709,026
6 4,709,027
106 4,709,028
125 4,709,029
242 4,709,030
333 4,709,031
336 4,709,033
363 4,709,032
401 4,709,034
407 4,709,035

CLASS 546

167 4,709,036
271 4,709,037
316 4,709,038

CLASS 548

237 4,709,039
4,709,040
260 4,709,041
312 4,709,042
318 4,709,043
321 4,709,044
352 4,709,045
409 4,709,046
435 4,709,047
439 4,709,048
513 4,709,049
520 4,709,050
533 4,709,051
548 4,709,052
561 4,709,053

CLASS 549

214 4,709,054
215 4,709,055
246 4,709,056
262 4,709,057
267 4,709,058
453 4,709,059
511 4,709,060
544 4,709,061
553 4,709,062
561 4,709,063

CLASS 556

418 4,709,064
428 4,709,065
437 4,709,066
440 4,709,067
447 4,709,068

CLASS 558

265 4,709,069
322 4,709,070
4,709,071
450 4,709,072

CLASS 560

24 4,709,073
33 4,709,074
41 4,709,075
55 4,709,076
66 4,709,079
86 4,709,080
056 4,709,077
060 4,709,078
100 4,709,081
105 4,709,082
110 4,709,083
118 4,709,084
124 4,709,085
171 4,709,086
339 4,709,087

CLASS 562

414 4,709,088
494 4,709,089
537 4,709,090
595 4,709,091

CLASS 564

89 4,709,092
166 Re.32,550
220 4,709,093
238 4,709,094
253 4,709,095
374 4,709,096

CLASS 568

443 4,709,097
491 4,709,098
624 4,709,099
639 4,709,100
697 4,709,101
780 4,709,102
851 4,709,103
853 4,709,104
883 4,709,105
917 4,709,106
927 4,709,107

CLASS 585

415 4,709,108
438 4,709,109
463 4,709,110
503 4,709,111
513 4,709,112
640 4,709,113
4,709,114
643 4,709,115
738 4,709,116
4,709,117
820 4,709,118

CLASS 600

544 N 4,708,825

CLASS 604

5 4,708,713
4,708,714
6 4,708,715
20 4,708,716
35 4,708,717
53 4,708,718

CLASS 924

80 4,708,868

CLASSIFICATION OF DESIGNS

D2— 190 292,840
270 292,841
D3— 25 292,842
37 292,843
48 292,844
292,845
292,846
52 292,847
76 292,848
100 292,849
D4— 128 292,850
D6— 300 292,851
335 292,852
292,853
366 292,854
381 292,855
484 292,856
494 292,857
511 292,858
518 292,859
566 292,860
D7— 73 292,861
332 292,862
338 292,863
351 292,864
D8— 10 292,865
41 292,866
102 292,867
331 292,868
346 292,869
354 292,870
292,871
292,872
375 292,873
D9— 377 292,874
317 292,875
337 292,876
292,877
341 292,878
345 292,879
349 292,880
292,881
292,883
373 292,884
376 292,885
381 292,886
424 292,887
432 292,888
435 292,882
449 292,889
D10— 39 292,890
101 292,891
106 292,892
112 292,893
113 292,894
120 292,895
D11— 11 292,896
182 292,897
216 292,898
D12— 16 292,899
158 292,900
169 292,901
292,902
184 292,903
203 292,904
206 292,905
211 292,906
292,907
300 292,908
319 292,909
331 292,910
345 292,911
D13— 6 292,912
8 292,913
40 292,914
D14— 1 292,915
36 292,916
38 292,917
53 292,918
292,919
62 292,920
292,921
64 292,922
68 292,923
292,924
292,925
107 292,926
114 292,927
D15— 69 292,928
292,929
70 292,930
134 292,931
D19— 62 292,932
D23— 244 292,933
292,935
259 292,934
D25— 56 292,936
D34— 19 292,937
29 292,938
D99— 99 292,939

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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

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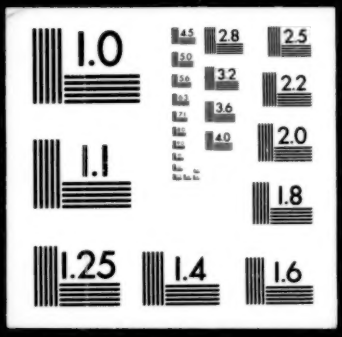
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